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A Preliminary Report on the Herpetology of Fillmore County, Minnesota

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Geography

Fillmore County is rectangular in shape and encompasses a total area of 862 square miles (roughly 1387 km²) in the extreme southeastern corner of the state of Minnesota. Straight-line distance to the western bank of the Mississippi River is approximately 25 to 30 miles (40 to 48 km) due east across adjacent Houston County, Minnesota. The Minnesota/Iowa border forms the county's southern boundary (specifically Iowa's Howard and Winneshiek Counties) while the Minnesota counties of Olmsted and Winona border Fillmore to the north. Completing the circuit, Mower County, Minnesota, borders Fillmore County to the west (see Figure 1).

Collectively, the boundaries of the far southeastern Minnesota counties (Goodhue, Fillmore, Houston, Olmsted, Wabasha and Winona, as well as the southeastern portions of Dakota) roughly delineate the extent of a narrow strip of Paleozoic Plateau which escaped glaciation during the latest or Wisconsin Ice Age (Tester, 1995). The topography of this geologic region, known locally as the "Driftless Area," is largely dominated by an extensive expanse of stream-dissected bluffs characterized by steep limestone bluffs or cliffs and the associated valleys cut by rivers, streams, and other seasonally flowing water courses.

This rugged landscape extends westward from the Mississippi River in a wavelike series of uplands and valleys, the

westernmost limit of which is reached in the more easterly portions of Fillmore County (Coffin and Pfannmuller, 1988). The naturally occurring pre-settlement vegetation of the region consisted mainly of mixed maple, basswood and oak Deciduous Forest with scattered pockets of Upland Prairie plant communities (Marschner, 1974). Remnants of these habitats, as well as regenerated woodlands currently occupy a significant proportion of eastern Fillmore County.

To the west Fillmore County's landscape flattens considerably, terminating in a fairly substantial area of glacial ground moraines along the western border. Most likely deposited during a period of rapid retreat of the late Wisconsin ice sheet (Coffin and Pfannmuller, 1988), this area of glacial till plains is probably topographically best described as flat to gently rolling. Dominant pre-settlement vegetation in the western portions of the county consisted largely of bur and pin oak dominated plant communities and the associated thickets and prairie openings typical of Oak Woodland/Brushland vegetational transition zones. Sizeable areas of Deciduous Woodland and small pockets of Upland Prairie habitats were also present (Marschner, 1974).

Interestingly, although located in "the Land of 10,000 Lakes" (actual number of lakes in the state probably exceeds 15,000), Fillmore is the only one of Minnesota's 87 counties in which a lake (natural or man-made) does not occur. In fact, naturally occurring bodies of permanent standing water of any type are poorly represented throughout the county and what little lentic aquatic habitat that does exist is mainly in the form of farmland "livestock ponds" and other similar small water-filled depressions.

While standing bodies of water are indeed rare, Fillmore County possesses an abundance of flowing-water aquatic habitats, particularly in the central and eastern sections of the county. The North, Middle and South Branches of the Root River, by far the county's most significant waterway, dissect the landscape as they flow eastward to the Mississippi. Numerous smaller tributary streams and creeks, while intermittent or seasonally dry in the far west, retain water throughout the year elsewhere in the county. The Upper Iowa River meandering in and out along the southern border also contributes significantly to the moving-water habitats of Fillmore County.

Herpetological History

Despite being located in the most herpetologically diverse region of the state (at least 39 of Minnesota's 50 native amphibian and reptile species have been recorded in the Driftless Area), the herpetofauna of Fillmore County nevertheless remains among the most poorly known of any county in southeastern Minnesota. Historically, all early exploratory expedi-

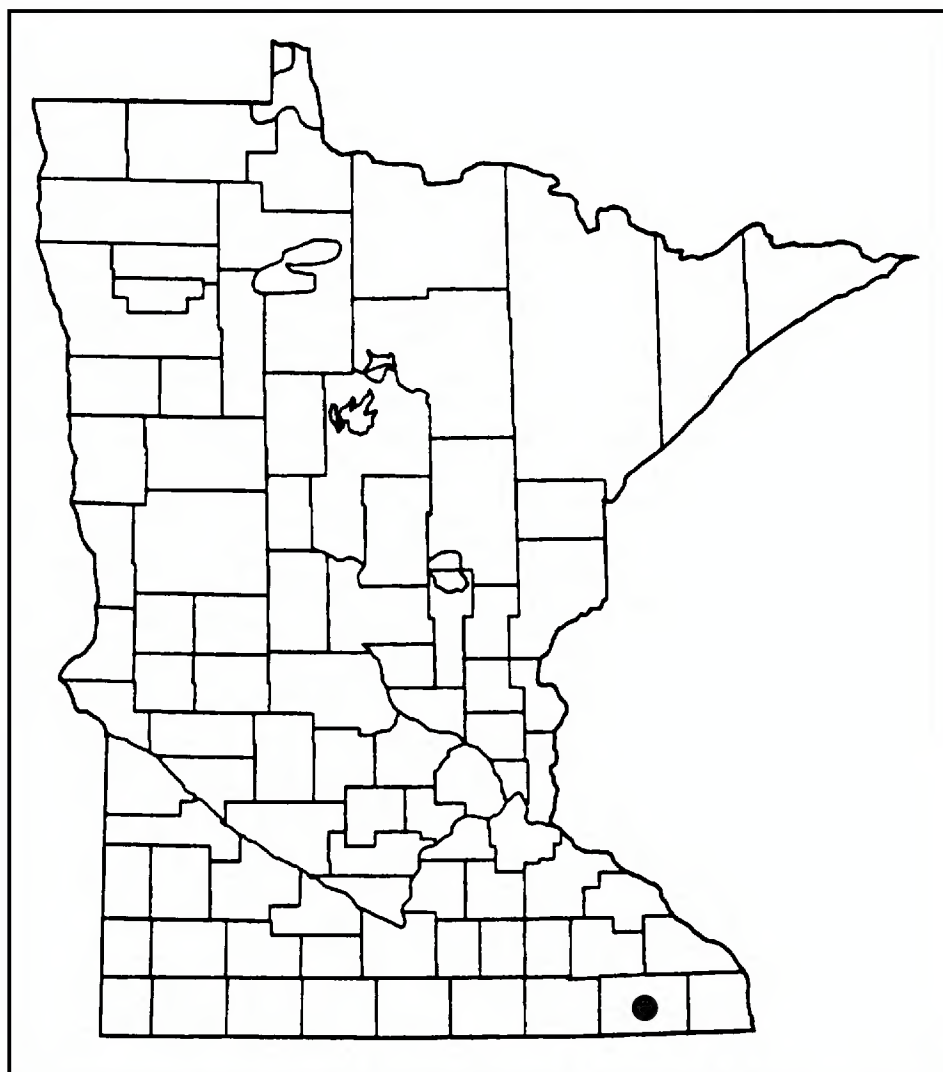


Figure 1. Location of Fillmore County, Minnesota (●).

tions occurred largely in those areas immediately adjacent to the Mississippi River and surviving records of these excursions provide only brief comments on the herpetofauna of Minnesota's "Bluffland" counties. Federally funded Railroad Surveys and similar government projects generally passed well to the north as well.

While clearly among the earliest references to the amphibians and reptiles of southeast Minnesota, nothing in the narratives of Hennepin (1698), Keating (1825), and Beltrami (1828) provide any indication that these individuals ever entered into what is now considered Fillmore County. Jonathan Carver (1796) most likely also visited the region late in the 18th century and his chronicle of this journey includes a list of 10 species of amphibians and reptiles encountered during the course of his travels. A complete lack of locality information regarding these herpetological observations in Carver's journal, however, makes it impossible to determine just where (if anywhere) within Minnesota his sightings occurred. Carver's exploratory forays, like those of Beltrami, Hennepin and Keating, would have been by necessity largely confined to areas readily accessible from the shores of the Mississippi.

The monumental review of North America's herpetofauna by John Edwards Holbrook (1842) was published well before Minnesota achieved statehood in 1858 and the territory encompassing the future state is not specifically referred to anywhere within the title's five volumes. While several of Holbrook's numerous scientifically minded predecessors, contemporary colleagues, and correspondents must have had at least limited exposure to the fauna of the Upper Mississippi River Valley (Thomas Say, for example), Holbrook incorporated surprisingly little distributional information from the region into his finished manuscript.

Museum specimen citations or other references to Minnesota's amphibians and reptiles are, likewise, rare in Cope's early "nationwide" herpetological monographs (Cope, 1889, 1900). In fact, with the exception of two brief notes by Friedrich (1934) and Swanson (1935), the actual composition of the state's herpetofauna was to remain virtually undocumented until the pioneering investigations and field work of Walter J. Breckenridge in the mid-to-late 1930s and early 1940s. Breckenridge's study, initially undertaken in 1935 as the research portion of his Ph.D. dissertation (Breckenridge, 1941), yielded a multitude of published herpetological contributions and culminated in the publication of his *Reptiles and Amphibians of Minnesota* (Breckenridge, 1944a), the first comprehensive review of the herpetofauna of the state. In the nearly nine years spent accumulating distribution data for this monograph, Breckenridge "collected material in almost every county in the state," a truly outstanding expression of his endurance and patience when one realizes that Minnesota is the 12th largest state in the Union. Somewhat ironically, verified records for exactly 12 Fillmore County amphibians and reptiles are included among the distribution maps of Breckenridge's manuscript.

Since the appearance of Breckenridge's monograph in 1944, relatively little additional information has been published on the herpetofauna of Fillmore County. Subsequent amphibian and

reptile collecting activities, as well as organized faunal surveys and related programs, in the Driftless Area have concentrated largely on Houston, Winona, and Wabasha Counties and have produced only limited herpetological data from elsewhere in southeastern Minnesota. The first published update of species known to occur in the county is that of Henderson (1980) who includes records for 16 Fillmore County amphibians and reptiles in his brief "checklist" of southeastern Minnesota's herpetofauna. Lang's (1982) report on the statewide status of Minnesota amphibians and reptiles provides more comprehensive distribution data and revised range maps, as well as records for two additional Fillmore County species.

The Minnesota Herpetological Society's (MHS) survey during the summer of 1985 is one of only two known systematic studies of the general distribution of Bluffland Region amphibians and reptiles to specifically include Fillmore County within study area boundaries. Fillmore County amphibians and reptiles recorded in MHS survey results include three species previously unrecorded from the county (Moriarty, 1986). Somewhat surprisingly, two of these previously unrecorded species, the common snapping turtle, *Chelydra serpentina*, and the painted turtle, *Chrysemys picta*, are the first turtles ever reported from Fillmore County. More recently, Minnesota Department of Natural Resources (MNDNR)/Minnesota County Biological Survey (MCBS) Fillmore County field activities concluded in 1996, but complete survey results have not yet been publicized and this study has so far yielded few significant herpetological contributions.

Oldfield and Moriarty (1994) summarize the accumulated distribution data of the previous 50+ years and, with records for 24 Fillmore County amphibians and reptiles, provide the most recent update of the county's known herpetofauna. The distribution maps included in their publication, however, simply document whether a species has ever been recorded within any given county and provide no indication as to where any amphibian or reptile actually occurs. Moriarty's (1996) recent update of these range maps includes no additional new Fillmore County records.

NorthStar's interest in the herpetology of southeastern Minnesota initially began in early 1993 while the senior author was engaged in area fieldwork for the MNDNR. While visited on infrequent occasions previously, Fillmore County fieldwork intensified following our relocation to the City of Lanesboro in August 1996. To date, NorthStar survey activities have verified the presence, often in significant numbers, of 17 of the 24 amphibians and reptiles recorded in the county by Oldfield and Moriarty (1994). One previously unreported Fillmore County species, the mudpuppy, *Necturus maculosus*, was also recorded during the 1997 field season (official publication in *Herpetological Review* pending). Detailed distribution maps plotting the Fillmore County localities of each recorded species are currently in various stages of preparation.

Herpetology

With 25 documented species, Fillmore County ranks fourth behind the southeastern Minnesota counties of Winona (37 species), Houston (35 species) and Wabasha (30 species) in

terms of total number of recorded amphibians and reptiles. Not surprisingly, species with geographic distributions largely confined to the Upper Mississippi River Valley contribute significantly to these higher species totals and Winona, Houston and Wabasha each have records for at least four riverine turtles unlikely to occur within the boundaries of Fillmore. At the same time, the survey bias which has so heavily favored fieldwork in these three more easterly counties is almost certainly at least partially responsible for remaining differences in reported herpetological diversity. Regional distribution data, when analyzed, provide records of 12 additional Driftless Area amphibians and reptiles, including several common and widespread species, not yet recorded in Fillmore County. Conversely, at least one documented Fillmore County species remains unrecorded in each of the surrounding Minnesota counties. A more comprehensive review of those peripheral species most likely to occur within Fillmore County is provided elsewhere in this report.

As might be expected, the snakes with nine and the frogs with seven recorded species, respectively, form the dominant components of Fillmore County's known herpetofauna. Together, these two groups account for 68% of all recorded species, a ratio slightly in excess of their combined percentage (63%) when computed on a statewide basis. Other reported Fillmore County amphibians and reptiles include four turtles, two salamanders, and two of Minnesota's three recorded lizards. These 25 recorded amphibians and reptiles are summarized in Table 1. Brief observations regarding the countywide abundance, distribution, and status of each of these 25 species have been provided below as well.

In the subsequent accounts of Fillmore County's recorded amphibians and reptiles the author(s) supplying the earliest known published report as well as the original publication date is specified immediately following each species' scientific and common name. For the sake of clarity, all such Breckenridge records have simply been cited as 1944a even though the majority of these species are reported in his earlier Ph.D. dissertation (Breckenridge, 1941). The source citation for all referenced records from Minnesota counties peripheral to Fillmore is Oldfield and Moriarty (1994). Additional references are provided in standard Literature Cited format. Naturally, all township (twp) references explicitly apply to officially recognized townships within Fillmore County unless stated otherwise. The scientific nomenclature utilized in this report conforms to the standardized usage proposed by Collins (1997).

Ambystoma tigrinum, Tiger Salamander

Original report: Breckenridge, 1944a. Most westerly record Forestville State Park, Forestville Twp (Moriarty, 1986). Multiple eastern locality records in Amherst, Carrolton, Holt and Preston Twps (NorthStar, unpubl. data). One notably large 1997 Holt Twp specimen, a male 10 inches (25.4 cm) in total length, is currently part of the Lanesboro Living Museum of Natural History's (LLMNH) live animal collection. Multiple records from within the City of Lanesboro. Possibly widespread particularly in eastern Fillmore County. Peripheral county records in Olmsted and Winona to the north and Houston to the east. Howard and Winneshiek Counties, Iowa,

included in published distribution maps (Christiansen and Bailey, 1991).

Necturus maculosus, Mudpuppy

Original report: Levell, in press. New county Record: A single large adult caught by a local angler (Brian Asleson) on 15 October 1997, in "Bear Creek" west of the town of Fillmore, Fillmore Twp, west-central Fillmore County. Fathead minnow, *Pimephales promelas*, reported live bait species taken. This specimen, still alive when initially brought in for identification, died as a result of injuries sustained during capture and is currently part of the LLMNH collection of preserved material. Considering the extent of existing suitable habitat, *Necturus* may prove to be widespread in the county. Survey and "Wanted" poster campaigns in 1998 will, hopefully, produce additional Fillmore County records. Peripheral record in Houston County to the east. Winneshiek County, Iowa, included in published distribution maps (Christiansen and Bailey, 1991).

Acris crepitans, Northern Cricket Frog

Original report: Breckenridge, 1944a. Far western locality record in Spring Valley Twp (Lang, 1982). Additional Fillmore County locality data currently unavailable. Northern populations of *Acris crepitans* have experienced a well-reported decline over the past three decades (Vogt, 1981; Mossman and Hine, 1985; Harding and Holman, 1992; Moriarty and Oldfield, 1994; Harding, 1997) and the species has not been reliably recorded from anywhere in Minnesota since 1991 (Whitford, 1991). Suitable habitat still exists within Fillmore County and future survey activities should target such areas during the breeding season in a further attempt to document this species. Peripheral county records in Mower to the west, Olmsted to the north, and Houston to the east. Howard and Winneshiek Counties, Iowa, included in published distribution maps (Christiansen and Bailey, 1991).

Bufo americanus, American Toad

Original report: Lang, 1982. Most westerly recorded locality Rifle Hill Quarry approximately 1.5 miles (2.4 km.) east of the Town of Cherry Grove, Forestville Twp (NorthStar, unpublished data). Multiple eastern locality records in Amherst, Carrolton, Holt, Preble and Preston Twps (Moriarty, 1986; NorthStar, unpubl. data). One 1997 Carrolton Twp specimen currently part of the LLMNH live animal collection. Widespread and locally abundant particularly in eastern Fillmore County, frequently recorded within the corporate limits of area cities and towns. Further field investigation will undoubtedly yield additional records. Peripheral records in all surrounding Minnesota counties. Howard and Winneshiek Counties, Iowa, included in published distribution maps (Christiansen and Bailey, 1991).

Hyla versicolor, Gray Treefrog

Original report: Henderson, 1980. Species identification (*H. versicolor* or *H. chrysoscelis*) based on subtle differences in coloration, size, voice and habitat preference reported by Vogt (1981) and Oldfield and Moriarty (1994). Multiple eastern locality records in Carrolton and Holt Twps (NorthStar, unpub-

Table 1. Amphibians and reptiles recorded from Fillmore County, Minnesota.

Species Common name	Existing documentation			Recorded in 1997	Relevant comments and notes
	Post-1960	Pre-1960	Literature		
<i>Ambystoma tigrinum</i> Tiger salamander	•			••	Recorded during 1997 from at least 10 localities in five Fillmore County townships
<i>Necturus maculosus</i> Mudpuppy	Not previously recorded from Fillmore County			••	New county record: “Bear Creek” west of the town of Fillmore*
<i>Acris crepitans</i> Northern cricket frog		•			Possibly extirpated from state
<i>Bufo americanus</i> American toad	•			••	Widespread in Fillmore County
<i>Hyla versicolor</i> Gray treefrog	•			••	Widespread in eastern Fillmore County
<i>Pseudacris crucifer</i> Spring peeper	•			••	Recorded during 1997 from two Carrolton Township localities
<i>Pseudacris triseriata</i> Western chorus frog	•			••	Recorded during 1997 from one Carrolton Township locality
<i>Rana clamitans</i> Green frog	•				Suitable Fillmore County habitats insufficiently sampled during 1997
<i>Rana palustris</i> Pickerel frog		•			Suitable eastern Fillmore County habitat insufficiently sampled during 1997
<i>Rana pipiens</i> Northern leopard frog	•			••	Recorded during 1997 from suitable habitat in eastern Fillmore County
<i>Apalone spinifera</i> Spiny softshell turtle			•	••	Recorded during 1997 from Root River North Branch, Carrolton and Pilot Mound Townships
<i>Chelydra serpentina</i> Snapping turtle			•	••	Widespread in suitable Fillmore County habitats
<i>Chrysemys picta</i> Painted turtle	•			••	Recorded during 1997 from suitable habitats in eastern Fillmore County
<i>Emydoidea blandingii</i> † Blanding’s turtle			•		Suitable Fillmore County habitat not yet located
<i>Cnemidophorus sexlineatus</i> Six-lined racerunner	•				Suitable Fillmore County habitat insufficiently sampled during 1997
<i>Eumeces fasciatus</i> Five-lined skink	•				Suitable Fillmore County habitat insufficiently sampled during 1997
<i>Crotalus horridus</i> † Timber rattlesnake	•			••	Recorded during 1997 in “selected” Carrolton Township localities
<i>Diadophis punctatus</i> Ringneck snake		•		••	Recorded during 1997 from Holt Township
<i>Elaphe vulpina</i> Fox snake	•			••	Widespread in eastern Fillmore County
<i>Lampropeltis triangulum</i> Milk snake	•			••	Widespread in eastern Fillmore County
<i>Nerodia sipedon</i> Northern water snake		•		••	Recorded during 1997 from suitable habitats in eastern Fillmore County
<i>Pituophis catenifer sayi</i> Bullsnake	•			••	Recorded during 1997 from Carrolton and Holt Townships
<i>Storeria occipitomaculata</i> Redbelly snake	•			••	Recorded during 1997 from Forestville Township
<i>Thamnophis radix</i> Plains garter snake		•			Suitable Fillmore County habitat insufficiently sampled during 1997
<i>Thamnophis sirtalis</i> Common garter snake	•			••	Widespread in eastern Fillmore County

• Source: Oldfield and Moriarty (1994)

•• Source: NorthStar Herpetological Associates 1997 field data

† State protected species

* Lanesboro Living Museum of Natural History collection



Figure 2. American toad, *Bufo americanus*, from Lanesboro, Fillmore County, Minnesota. Photograph by John P. Levell.

lished data). Additional Fillmore County locality data unavailable. Three 1997 Carrolton Twp specimens are currently part of the LLMNH live animal collection. Abundant and widespread particularly in eastern Fillmore County, multiple records within the City of Lanesboro. Peripheral county records in Olmsted and Winona to the north and Houston to the east. Howard and Winneshiek Counties, Iowa, included in published composite species (*chrysoscelis/versicolor*) distribution maps (Christiansen and Bailey, 1991).

Pseudacris crucifer, Spring Peeper

Original report: Breckenridge, 1944a. Two eastern locality records in Carrolton Twp (NorthStar, unpubl. data). Additional Fillmore County locality data currently unavailable. Abundant where recorded including within the corporate limits of Lanesboro. Future survey activities targeting suitable habitat should provide additional records. Peripheral county records in Olmsted and Winona to the north and Houston to the east. Howard and Winneshiek Counties, Iowa, included in published distribution maps (Christiansen and Bailey, 1991).

Pseudacris triseriata, Western Chorus Frog

Original report: Henderson, 1980. One eastern locality record in Carrolton Twp (NorthStar, unpubl. data). Additional Fillmore County locality data currently unavailable. Relatively abundant where recorded. Future survey activities targeting suitable habitat should record this species in additional Twps. Peripheral county records in Mower to the west and Olmsted and Winona to the north. Howard and Winneshiek Counties, Iowa, included in published distribution maps (Christiansen and Bailey, 1991).

Rana clamitans, Green Frog

Original report: Breckenridge, 1944a. Eastern locality records in Carrolton and Preble Twps (Moriarty, 1986). Additional Fillmore County locality data unavailable. Future survey activities should target areas of suitable habitat in an attempt to further document the distribution and abundance of this species. Peripheral records in all surrounding Minnesota counties. Howard and Winneshiek Counties, Iowa, included in published distribution maps (Christiansen and Bailey, 1991).



Figure 3. Northern leopard frog, *Rana pipiens*, from Lanesboro, Fillmore County, Minnesota. Photograph by John P. Levell.

Rana palustris, Pickerel Frog

Original report: Breckenridge, 1944a. Far western locality records in Sumner and Bloomfield Twps (Lang, 1982). Additional Fillmore County locality records unavailable. Suitable Fillmore County habitat exists and future survey activities in these areas should yield additional records. Peripheral county records in Mower to the west, Winona to the north and Houston to the east. Howard and Winneshiek Counties, Iowa, included in published range maps (Christiansen and Bailey, 1991).

Rana pipiens, Northern Leopard Frog

Original report: Breckenridge, 1944a. Most westerly recorded locality Forestville State Park, Forestville Twp (Moriarty, 1986). Multiple eastern locality records in Amherst, Carrolton and Preble Twps (Moriarty, 1986; NorthStar, unpubl. data). Relatively abundant where recorded including within the City of Lanesboro. Future survey activities will undoubtedly yield additional records. Peripheral records in all surrounding Minnesota counties. Howard and Winneshiek Counties, Iowa, included in published distribution maps (Christiansen and Bailey, 1991).

Apalone spinifera, Spiny Softshell Turtle

Original report: Oldfield and Moriarty, 1994. Two eastern locality records from the Root River "North Branch" in Carrolton and Pilot Mound Twps (NorthStar, unpubl. data). Additional Fillmore County locality records unavailable. Considering the extent of suitable habitat, possibly widespread in Fillmore County. Peripheral county records in Mower to the west, Olmsted and Winona to the north and Houston to the east. Iowa distribution data not currently available.

Chelydra serpentina, Snapping Turtle

Original report: Moriarty, 1986. Most westerly recorded locality Forestville State Park, Forestville Twp (Moriarty, 1986). Multiple eastern locality records in Carrolton and Holt Twps (Moriarty, 1986; NorthStar, unpubl. data). Widespread and common in eastern Fillmore County and future survey activities will undoubtedly yield additional records. Peripheral county records in Olmsted and Winona to the north and Houston to the east. Iowa distribution data not currently available.

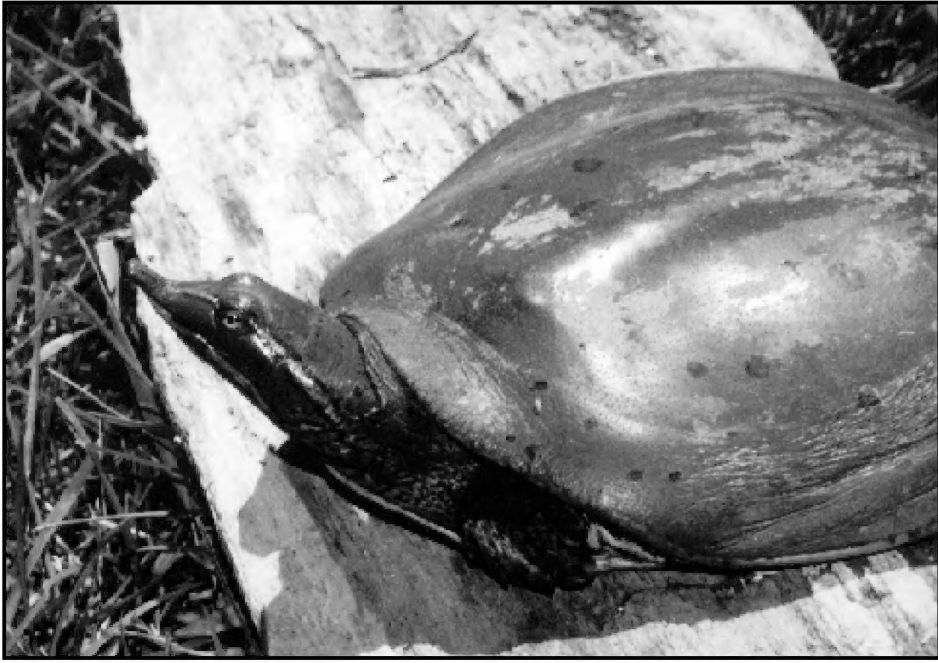


Figure 4. Spiny softshell turtle, *Apalone spinifera*, from Houston County, Minnesota. Photograph by John P. Levell

Chrysemys picta, Painted Turtle

Original report: Moriarty, 1986. Most westerly recorded locality Forestville State Park, Forestville Twp (Moriarty, 1986). Multiple eastern locality records in Carrolton and Holt Twps (NorthStar, unpubl. data). One juvenile 1997 Holt Twp specimen currently part of the LLMNH live animal collection. Widespread in suitable habitats and future survey activities will undoubtedly yield additional records. Peripheral records in all surrounding Minnesota counties. Iowa distribution data not currently available.

Emydoidea blandingii, Blanding's Turtle

Original report: Oldfield and Moriarty, 1994. A single north central Fillmore County locality record in Pilot Mound Twp (MNDNR, unpubl. data). Additional Fillmore County locality records currently unavailable, but several unsubstantiated sightings reported from the vicinity of Lanesboro in Carrolton Twp. Future survey activities should target all areas of suitable habitat in an attempt to further document the distribution and abundance of this species. Listed as a State Threatened Species by the MNDNR. Peripheral records in all surrounding Minnesota counties. Iowa distribution data not currently available.

Cnemidophorus sexlineatus, Six-lined Racerunner

Original report: Oldfield and Moriarty, 1994. One eastern locality record from the Rushford Sand Dunes State Natural Area in City of Rushford Village Twp (MNDNR unpubl. data). Additional Fillmore County locality records currently unavailable. Considering the extent of existing suitable habitat, possibly widespread particularly in eastern Fillmore County. Future field surveys activities should target all areas of suitable habitat in an attempt to further document the distribution and abundance of this species. Peripheral county records in Winona to the north and in Houston to the east. Iowa distribution data not currently available.

Eumeces fasciatus, Five-lined Skink

Original report: Moriarty, 1986. One far eastern locality record "Hanson Bluff," Preble Twp (Moriarty, 1986). Additional Fillmore County locality data currently unavailable. Considering the extent of existing suitable habitat, possibly widespread particularly in eastern Fillmore County. Future



Figure 5. Six-lined racerunner, *Cnemidophorus sexlineatus*, from Houston County, Minnesota. Photograph by J. S. Davis.

survey activities should target all existing areas of suitable habitat in an attempt to further document the distribution and abundance of this species within the county. Peripheral county records in Winona to the north and in Houston to the east. Iowa distribution data not available.

Crotalus horridus, Timber Rattlesnake

Original report: Breckenridge, 1944a. Multiple eastern locality records in Carrolton, Holt and City of Rushford Village Twps (Lang, 1982; NorthStar, unpubl. data). Heavily persecuted throughout the southeastern portion of the state virtually from the beginning of European settlement. The Minnesota State Legislature actually authorized rattlesnake bounty payments until 1989 when this legislation was finally successfully repealed (Keyler and Oldfield, 1992). One Lanesboro-area bounty hunter alone, the late Arnie Rank (1904–1976), reputedly captured and killed in excess of 2,000 timber rattlesnakes over a 42-year period (Drake and Drake, 1969). Despite this long history of persecution, apparently viable populations still exist in at least a few scattered eastern Fillmore County localities. Future field investigations should target all existing areas of suitable habitat in an attempt to further document the abundance and distribution of this species. Recently listed (1996) as a State Threatened Species by the MNDNR. Peripheral county records in Olmsted and Winona to the north and in Houston to the east. Howard and Winneshiek Counties, Iowa, included in published distribution maps (Christiansen and Bailey, 1990).

Diadophis punctatus, Ringneck Snake

Original report: Breckenridge, 1944a. Eastern locality records in City of Rushford Village (Lang, 1982) and Holt Townships (NorthStar, unpubl. data). Additional locality data currently unavailable. Locally abundant where recorded. Considering the extent of existing suitable habitat, probably widespread particularly in eastern Fillmore County. Future survey activities should yield numerous additional records. Peripheral county records in Winona to the north and Houston to the east. Howard and Winneshiek Counties, Iowa, included in published distribution maps (Christiansen and Bailey, 1990).

Elaphe vulpina, Fox Snake

Original report: Henderson, 1980. Multiple eastern locality



Figure 6. Northern water snake, *Nerodia sipedon*, from Fillmore County, Minnesota. Photograph by John P. Levell.

records in Carrolton and Holt Twps (Lang, 1982; Moriarty, 1986; NorthStar, unpubl. data). North-central locality records in Chatfield Twp (Lang, 1982; NorthStar, unpubl. data). Two 1997 Fillmore County specimens (Carrolton and Chatfield Twps) are currently part of the LLMNH live animal collection. Widespread and abundant where recorded, including within the city of Lanesboro. Future survey activities should yield additional records. Peripheral records in all surrounding Minnesota counties. Howard and Winneshiek Counties, Iowa, included in published range maps (Christiansen and Bailey, 1990).

Lampropeltis triangulum, Milk Snake

Original report: Breckenridge, 1944a. Most westerly locality record Forestville State Park, Forestville Twp (Moriarty, 1986). North central locality record in Pilot Mound Twp (Lang, 1982). Multiple eastern locality records in Amherst, Carrolton and Holt Twps (NorthStar, unpubl. data). Considering the extent of existing habitat, probably widespread particularly in eastern Fillmore County. Future survey activities targeting areas of suitable habitat should yield additional records. Peripheral county records in Olmsted and Winona to the north and Houston to the east. Howard and Winneshiek Counties, Iowa, included in published range maps (Christiansen and Bailey, 1990).

Nerodia sipedon, Northern Water Snake

Original report: Breckenridge, 1944a. Most westerly locality record Forestville Twp (Lang, 1982). Multiple eastern locality records in Carrolton and Holt Twps (Lang, 1982; NorthStar, unpubl. data). Recorded within the corporate limits of the City of Lanesboro. Several 1997 Carrolton County specimens are currently part of the LLMNH live animal collection. Probably widespread considering the extent of existing suitable habitat and future survey activities should yield additional records. Peripheral records in all surrounding Minnesota counties. Howard and Winneshiek Counties, Iowa, included in published distribution maps (Christiansen and Bailey, 1990).

Pituophis catenifer sayi, Bullsnake

Original report: Henderson, 1980. Eastern locality records in Carrolton and Holt Twps (Lang, 1982; NorthStar, unpubl. data). Additional Fillmore County locality records unavailable. One large 1997 Holt Twp specimen currently part of the

LLMNH live animal collection. Possibly widespread in Fillmore County. Peripheral county records in Winona to the north and Houston to the east. Howard and Winneshiek Counties, Iowa, included in published distribution maps (Christiansen and Bailey, 1990).

Storeria occipitomaculata, Redbelly Snake

Original report: Lang, 1982. Multiple far western locality records in Bristol and Forestville Twps (Lang, 1982; Moriarty, 1982; NorthStar, unpubl. data). Additional Fillmore County locality records currently unavailable. Possibly widespread in western Fillmore County considering the extent of existing suitable habitat. Peripheral county records in Mower to the west and Olmsted and Winona to the north. Howard and Winneshiek Counties, Iowa, included in published distribution maps (Christiansen and Bailey, 1990).

Thamnophis radix, Plains Garter Snake

Original report: Breckenridge, 1944a. "Western Fillmore County," recorded acquisition catalog locality data for two James Ford Bell Museum (JFBM) specimens collected in 1938. Additional Fillmore County locality records currently unavailable. Future field investigations should target all existing areas of suitable habitat, particularly in western Fillmore County, in an attempt to further document the abundance and distribution of this species. Peripheral county records in Mower to the west, Winona to the north and Houston to the east. Howard and Winneshiek Counties, Iowa, included in published distribution maps (Christiansen and Bailey, 1990).

Thamnophis sirtalis, Common Garter Snake

Original report: Breckenridge, 1944a. Multiple eastern locality records in Amherst, Carrolton, Holt, Preble and Preston Twps (Moriarty, 1986; NorthStar, unpubl. data). One 1997 Carrolton Twp "red-sided" specimen is currently part of the LLMNH live animal collection. Widespread and often extremely common, frequently recorded within the corporate limits of area cities and towns. Future field activities will undoubtedly produce numerous additional Fillmore County records. Peripheral records in all surrounding Minnesota counties. Howard and Winneshiek Counties, Iowa, included in published distribution maps (Christiansen and Bailey, 1990).

Peripheral Species

While 25 amphibians and reptiles have so far been recorded in Fillmore County, at least 16 additional species, including seven snakes, five turtles, three frogs and one salamander, have been reported from one or more of the surrounding Minnesota and Iowa counties. Of these peripheral species at least two; the brown snake, *Storeria dekayi*, and smooth green snake, *Liochlorophis vernalis*, range widely across southern Minnesota and northern Iowa and both almost certainly occur within the boundaries of Fillmore. The wood frog, *Rana sylvatica*, although apparently less widely distributed regionally, is also a likely inhabitant of the county. This conclusion is based largely upon the known distribution of the species and the extent of available suitable habitat, as well as on reliable but as yet unverified reports gathered during the 1997 field season.

Comparable unconfirmed reports regarding the bullfrog, *Rana catesbeiana*, while intriguing and clearly possible, must be viewed with at least some skepticism due to the high potential for confusing this species with the similar appearing green frog, *Rana clamitans*.

Other species with a fair chance of being recorded in Fillmore include the common map turtle, *Graptemys geographica*, and the blue racer, *Coluber constrictor*. Exhibiting a definite tendency to utilize smaller river valleys as a means of dispersal, each could readily enter eastern Fillmore County via a Root River “corridor.” The black rat snake, *Elaphe obsoleta*, while apparently of similar habit, is among the most poorly known reptiles in the area and it is impossible to make any comment regarding its regional distribution at this time. Records for the wood turtle, *Clemmys insculpta*, reported to both the north and south, are also surprisingly absent in southeastern Minnesota. Additional distribution information for each of the 16 peripheral Fillmore County species is provided in Table 2.

Concluding Statements

Although a beginning has been made, much herpetological work remains to be done in Fillmore County. Many reported amphibians and reptiles are known from only a few specimens and/or localities at best and post-1960 records are lacking for at least four of the 25 species. At the same time, basic distribution, abundance and status information for each of these species remains virtually unknown and at least 10 of Fillmore County’s 24 townships currently have no herpetological records of any type. Of the 14 townships with recorded species, six have records for exactly one amphibian or reptile. Particularly troublesome areas include the county’s western half, which has received little attention during previous surveys. Of the five western townships with recorded amphibians and reptiles, only Forestville has records for more than one species. While somewhat more fully explored, eastern Fillmore County’s three southern townships completely lack herpetological records as well.

Table 2. Fillmore County, Minnesota: Peripheral amphibian and reptile species.

Species Common name	County records and relevant comments
<i>Ambystoma laterale</i> Blue-spotted salamander	Post-1960 records from western Mower County (west). No additional nearby records and relatively unlikely to be recorded in Fillmore County.
<i>Hyla chrysoscelis</i> Cope’s gray treefrog	Literature records from Mower County (west). Reports in Iowa represent composite species records. Could conceivably occur in western Fillmore County.
<i>Rana catesbeiana</i> Bullfrog	Post-1960 records from Houston County (east) and Winona County (north). Unverified reports within Fillmore County.
<i>Rana sylvatica</i> Wood frog	Post-1960 records from Winona County (north). Pre-1960 records from Houston County (east). Unverified reports within Fillmore County.
<i>Apalone mutica</i> Smooth softshell turtle	Post-1960 records from Winona County (north). Pre-1960 records from Houston County (east). Minnesota distribution largely confined to the Mississippi River Valley.
<i>Clemmys insculpta</i> Wood turtle	Post-1960 records from Olmsted County. Reported from northeastern Iowa. Records absent for much of southeastern Minnesota despite extensive areas of apparently suitable habitat.
<i>Graptemys geographica</i> Common map turtle	Post-1960 records from Winona County (north) and Houston County (east). Recorded in numerous tributaries of the Mississippi, Minnesota and St. Croix Rivers in Minnesota.
<i>Graptemys ouachitensis</i> Ouachita map turtle	Post-1960 records from Winona County (north) and Houston County (east). Minnesota distribution largely confined to the Mississippi River Valley.
<i>Graptemys pseudogeographica</i> False map turtle	Post-1960 records from Winona County (north) and Houston County (east). Minnesota distribution largely confined to the Mississippi and Minnesota River Valleys.
<i>Coluber constrictor</i> Racer	Post-1960 records from Winona and Olmsted Counties (north) and Houston County (east). Reported in Winneshiek County, Iowa.
<i>Elaphe obsoleta</i> Rat snake	Post-1960 records from Olmsted County (north) and Houston County (east). Pre-1960 records from Winona County (north). Reported in Winneshiek County, Iowa.
<i>Heterodon nasicus</i> Western hognose snake	Post-1960 records from Winona County (north). Disjunct distribution with isolated populations in southeastern Minnesota and in Iowa.
<i>Heterodon platirhinos</i> Eastern hognose snake	Post-1960 records from Winona County (north) and Houston County (east). Minnesota records largely confined to the floodplains of the Mississippi River and its tributaries.
<i>Liochlorophis vernalis</i> Smooth green snake	Post-1960 records from Mower County (west). Pre-1960 records from Winona (north) and Houston County (east). Reported in Howard and Winneshiek Counties, Iowa. Widespread in Minnesota.
<i>Sistrurus catenatus</i> Massasauga	Literature records from Houston County (east). Reported in Winneshiek County, Iowa. Validity of Minnesota records and reports suspect (Levell, 1994).
<i>Storeria dekayi</i> Brown snake	Post-1960 records from Winona County (north) and Houston County (east). Recorded from Howard and Winneshiek Counties, Iowa. Widespread in central and southeastern Minnesota and in Iowa

Minnesota distribution data: Oldfield and Moriarty (1994)
Iowa distribution data: Christiansen and Bailey (1990; 1991)

Fortunately, NorthStar's recent relocation to Lanesboro in central Fillmore County is providing an unparalleled opportunity to examine the region's herpetofauna more thoroughly. Included among planned 1998 survey activities are several western field trips that will undoubtedly add new locality records for area amphibians and reptiles. Also on the drawing board are a variety of investigations targeting specific species and habitats. While clearly multiyear projects, these activities should produce additional data in the near future as well.

Acknowledgments

The authors would like to take this opportunity to express our sincere appreciation to the many Lanesboro area residents

who have so wholeheartedly welcomed us into their community. Deserving special mention is Robert "BeBop" Heeg, whose friendship and advice has invariably led to the "good stuff." Specimens provided by Brian Asleson, Robert Kramer, Keith Wold and the entire Qualy "gang" have likewise proven invaluable in the preparation of this report. The same must be said of the notes provided by Dr. Jeff Lang. Thanks are also due fellow herpetologists John Moriarty and Jeff LeClere who generously tracked down specimens and data in the now far away Bell Museum collection. Last but not least, the access to rare and hard to find manuscripts so graciously provided by the personnel of the Minneapolis Public Library's Rare Book Room and the Minnesota Historical Society Library must also be gratefully acknowledged.

Literature Cited and Selected References

- Beltrami, J. C. 1828. Discovery of the sources of the Mississippi and Bloody Rivers. London, England: Hunt and Clarke.
- Breckenridge, W. J. 1941. The amphibians and reptiles of Minnesota with special reference to the black-banded skink, *Eumeces septentrionalis* (Baird). Ph.D. thesis. University of Minnesota. Minneapolis, MN.
- . 1944a. Reptiles and amphibians of Minnesota. Minneapolis: University of Minnesota Press.
- . 1944b. The pilot black snake in Minnesota. *Copeia* 1944:64.
- Carver, J. 1796. Travels through the interior parts of North America. Philadelphia: Key and Simpson.
- Christiansen, J. L., and R. M. Bailey. 1988. The lizards and turtles of Iowa. Des Moines: Iowa Department of Natural Resources.
- Christiansen, J. L., and R. M. Bailey. 1990. The snakes of Iowa. Des Moines: Iowa Department of Natural Resources.
- Christiansen, J. L., and R. M. Bailey. 1991. The salamanders and frogs of Iowa. Des Moines: Iowa Department of Natural Resources.
- Cochran, P. A. 1981. The softshell turtles (genus *Trionyx*) in Minnesota. Pp. 15-18. In: L. Elwell, K. Cram and C. Johnson, editors, Ecology of reptiles and amphibians in Minnesota: Proceedings of a Symposium, Cass Lake, Minnesota. Cass Lake, MN: Headwaters Regional Environmental Education Center.
- Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's Endangered Flora and Fauna. Minneapolis: University of Minnesota Press.
- Collins, J. T. 1997. Standard common and current scientific names for North American amphibians and reptiles, 4th Edition. Society for the Study of Amphibians and Reptiles Herpetological Circular No. 25.
- Cope, E. D. 1889. The batrachia of North America. U.S. National Museum Bulletin No. 34.
- . 1900. The crocodilians, lizards and snakes of North America. Smithsonian Institute Annual Report for 1898.
- Drake, C. R., and V. L. Drake. 1969. River valley echoes: Lanesboro, Minnesota 1869-1969. Rochester, MN: Whiting Printers and Stationers.
- Elwell, L., K. Cram and C. Johnson, editors. 1981. Ecology of reptiles and amphibians in Minnesota: Proceedings of a symposium, Cass Lake, Minnesota. Cass Lake, MN: Headwaters Regional Environmental Education Center.
- Ernst, C. H. 1973. The distribution of the turtles of Minnesota. *J. Herpetology* 7:42-47.
- Ewert, M. A. 1985. Assessment of the current distribution and abundance of the wood turtle (*Clemmys insculpta*) in Minnesota and along the St. Croix National Scenic Waterway in Wisconsin. Report to the Nongame Wildlife Program, Minnesota Department of Resources. St. Paul, MN.
- Friedrich, G. W. 1934. Taxonomy and distribution of the fishes, amphibia and reptiles of Central Minnesota (abstract). *Proceedings of the Minnesota Academy of Science* 1:14-15.
- Hall, C. D. 1997. Minnesota county biological survey—Amphibian and reptile results, 1988-1994. Pp. 58-62. In: J. J. Moriarty and D. Jones, editors, Minnesota's amphibians and reptiles: Their conservation and status. Lanesboro, MN: Serpent's Tale Natural History Book Distributors.
- Harding, J. H. 1997. Amphibians and reptiles of the Great Lakes Region. Ann Arbor, MI: University of Michigan Press.

- Harding, J. H., and J. A. Holman. 1992. Michigan frogs, toads and salamanders: A field guide and pocket reference. East Lansing, MI: Michigan State University Museum.
- Henderson, C. 1980. Guide to the reptiles and amphibians of southeast Minnesota—Region 5. St. Paul, MN: Minnesota Department of Resources.
- Hennepin, L. 1698 (1903). A new discovery. Chicago: A. C. McClurg & Co.
- Holbrook, J. H. 1842 (1976). North American herpetology, 2nd Edition. Society for the Study of Amphibians and Reptiles Facsimile Reprint.
- Jaslow, A. P., and R. C. Vogt. 1977. Identification and distribution of *Hyla versicolor* and *Hyla chrysoscelis* in Wisconsin. *Herpetologica* 33:201-205.
- Jones, D. 1997. Herpetology in Minnesota and the history of the Minnesota Herpetological Society. Pp. 72-75. *In*: J. J. Moriarty and D. Jones, editors, Minnesota's amphibians and reptiles: Their conservation and status. Lanesboro, MN: Serpent's Tale Natural History Book Distributors.
- Kans, D. R. 1986. Field herpetology: Methods for the study of amphibians and reptiles in Minnesota. Bell Museum Natural History Occasional Paper #18.
- Keating, W. H. 1825. Narrative of an expedition to the source of St. Peter's River, Lake Winnepeek, Lake of the Woods, etc. 2 Vols. London, England: George B. Whittaker.
- Keyler, D. E., and B. L. Oldfield. 1992. Status of the timber rattlesnake (*Crotalus horridus*) in Minnesota. *In*: T. F. Tynning, editor. Conservation of the timber rattlesnake in the Northeast. Lincoln, MA: Massachusetts Audubon Society.
- Lang, J. W. 1982. The reptiles and amphibians of Minnesota: Distribution maps, habitat preferences, and selected references. Report to the Minnesota Department of Natural Resources. St. Paul, MN.
- Lang, J. W., and D. R. Karns. 1988. Amphibians and reptiles: Endangered, threatened, and special concern. *In*: B. Coffin and L. Pfannmuller, editors, Minnesota's endangered flora and fauna. Minneapolis: University of Minnesota Press.
- Levell, J. P. 1994. The search for *Sistrurus* in Minnesota. NorthStar Herpetological Associates Report to the Minnesota Department of Natural Resources. St. Paul, MN.
- . In press. Geographic distribution: *Necturus maculosus*. *Herpetological Review*.
- Marschner, F. J. 1974. The natural vegetation of Minnesota (map). U.S. Department of Agriculture, Forest Service - North Central Experiment Station. St. Paul, MN.
- Moriarty, J. J. 1985. 1985 southeast herp survey. *Minnesota Herpetological Society Newsletter* 5(11):6-7.
- . 1986. A survey of the amphibians and reptiles of southeastern Minnesota. *Minnesota Herpetological Society Occasional Paper* 1.
- . 1996. Updates to the distribution maps in amphibians and reptiles native to Minnesota. *Minnesota Herpetological Society Newsletter* 16(5):5-7.
- Oldfield, B., and D. Keyler. 1997. Timber rattlesnakes: Velvet tails of Minnesota's blufflands. Pp. 22-26. *In*: J. J. Moriarty and D. Jones, editors, Minnesota's amphibians and reptiles: Their conservation and status. Lanesboro, MN: Serpent's Tale Natural History Book Distributors.
- Oldfield, B., and J. J. Moriarty. 1994. Amphibians and reptiles native to Minnesota. Minneapolis: University of Minnesota Press.
- Perry, P. S., and M. H. Dexter. 1989. Snakes and lizards of Minnesota. Report to the Nongame Wildlife Program, Minnesota Department of Resources. St. Paul, MN.
- Stiles, R. B. 1938. The milk snakes in Minnesota. *Copeia* 1938:50.
- Swanson, G. 1935. A preliminary list of Minnesota amphibians. *Copeia* 1935(3):152-154.
- Tester, J. R. 1995. Minnesota's natural heritage: An ecological perspective. Minneapolis: University of Minnesota Press.
- Vogt, R. C. 1981. Natural history of amphibians and reptiles in Wisconsin. Milwaukee: Milwaukee Public Museum.
- Wendt, K. M., and B. A. Coffin. 1988. The natural vegetation of Minnesota at the time of the Public Land Survey: 1847 – 1907. Natural Heritage Program, Minnesota Department of Natural Resources. St. Paul, MN.
- Whitford, P. C. 1991. Final report on Blanchard's cricket frog survey of southeastern Minnesota—1990/1991. Report to the Nongame Wildlife Program, Minnesota Department of Resources. St. Paul, MN.

A Note on the Husbandry and Captive Reproduction of the Eublepharid Gecko *Goniurosaurus* sp.

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Some information has been published on members of the genus *Goniurosaurus* (Pope, 1935; Borner, 1981; Kluge, 1967; Grismer, 1987, 1997; Ota, 1989; Grismer et al., 1994; Frantz, 1993; Zhao and Adler, 1993). However, few data are available on husbandry and reproduction in these lizards (Tanaka, 1989; Kaverkin et al., 1994; Henkel and Schmidt, 1995). The following is an attempt to provide details concerning husbandry and reproduction in the Chinese leopard gecko (*Goniurosaurus* sp.). There are currently two recognized species and seven subspecies of *Goniurosaurus* (Grismer, 1987; Grismer et al., 1994); they include *G. lichtenfelderi* (*G. l. lichtenfelderi*, *G. l. hainanensis*) and *G. kuroiwae* (*G. k. yamashinae*, *G. k. orientalis*, *G. k. kuroiwae*, *G. k. splendens*, *G. k. toyanae*). Two new species have yet to be described. The species covered here is one of those and it will be named soon (Grismer, 1998 pers. com.)

Goniurosaurus sp. occurs in southern China and is sympatric with *G. l. hainanensis* on Hainan Island (Grismer, 1994). Detailed habitat accounts are not available for this species, but its congener *G. kuroiwae* from the Ryuku Archipelago, Japan, is known to occur in forested areas, normally around limestone rock. These lizards are nocturnal.

The Dallas Zoo acquired two male and four female wild-caught adult *Goniurosaurus* sp. from a dealer in June 1996. All specimens were set up individually in 10-gallon aquariums with a sphagnum moss substrate for a 60-day quarantine period. Small water bowls were provided, as were hide boxes containing a moist soil and moss mixture. Slabs of cork bark provided refuge and climbing props. The lizards were maintained at an ambient temperature of 82°F (27.8°C) with a two- to three-degree drop at night.

Philips® F20/T12 black lights were used as a source of ultraviolet lighting, but these specimens were never seen basking directly beneath them. However, some indirect UV irradiation could have been obtained from underneath the cork bark.

Each terrarium was misted daily with water to raise relative humidity, which is especially important during ecdysis to prevent excess skin from sticking to the digits. Dysecdysis is a common problem with many lizards that are kept too dry and can result in infection or even loss of digits if not corrected. *Goniurosaurus* sp., like many gekkonids, practice keratophagy (skin consumption) while shedding.

All adults fed readily on a varied diet of adult crickets (*Acheta domestica*), mealworms (*Tenebrio molitor*), and wax moth (*Galleria melonella*) larvae. Food was offered every other day and dusted once a week with a calcium supplement.

Upon acquisition, all reptiles at the Dallas Zoo are checked for internal parasites via fecal exams. Three negative samples

for each specimen must be logged before it is allowed to clear quarantine. Results of the *Goniurosaurus* sp. series revealed moderate levels of nematodes, various protozoa, oxyurids, and strongyloides. Each specimen was treated with an appropriate dose of Panacur® and no further parasites were observed in subsequent exams.

Three of the females were gravid upon arrival at Dallas. Each deposited a clutch of two eggs (mean = 26.6 mm × 13.2 mm; 2.8 g) in nest boxes on 22 July 1996, 6 August 1996 and 14 August 1996, respectively. Each pair of eggs was placed in a separate one-gallon airtight jar in a vermiculite-and-water medium mixed at a 1:1 ratio by weight. Incubation temperature was 78°F (25.5°C) during the day with a two- to three-degree drop at night. Three of the six eggs hatched within an average period of 105 days and the remaining neonates died in the egg. Cooler temperatures are believed to have caused a prolonged incubation period. Hatchlings averaged 47.9 mm SVL and 69.2 mm TL with a weight of 2.3 g.

After completing quarantine, one male and three female *Goniurosaurus* sp. were placed in a 45-gallon terrarium that was set up similar to the cages described above. An additional hide box was provided and filled with soil. The lizards used this site for defecation. Husbandry remained as described above.

Additional eggs were deposited in moss-filled nest boxes. Courtship and copulation were never observed and were assumed to have occurred at night. Kaverkin et al. (1994) state that the male *G. k. splendens* restrains his mate by grabbing her head with his mouth during copulation.

The eggs were set up under the same parameters, but higher incubation temperatures (82°F) were used. Subsequent hatchings occurred within an average period of 56 days. Average hatchling size and weight was the same as above.

Neonates were set up individually in 2½-gallon aquariums with a coconut husk fiber substrate and a hide box. Small pieces of cork bark were provided along with a small water bowl. These cages were misted daily to increase humidity. Philips® F20/T12 black lights or Zoo Med's Repti-Sun® UVB 310 bulbs were used for lighting. This is believed to be important to prevent the onset of metabolic bone disease. Two-week-old crickets (*Acheta domestica*) and wax moth (*Galleria melonella*) larvae were used for a staple diet and were dusted once a week with a calcium supplement. Hatchling *Goniurosaurus* sp. seem to thrive under these conditions.

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Literature Cited

- Borner, A. R. 1981. The genera of Asian eublepharine geckos and a hypothesis of their phylogeny. Misc. Art. Saurol., Cologne, Germany 2:1-15.

- Frantz, S. L. 1993. In search of Tokage Modoki, the Japanese leopard gecko (*Goniurosaurus* [*Eublepharis*] *kuroiwae*). *Vivarium* 4(5): 21-24.
- Grismer, L. L. 1987. Evidence for the resurrection of *Goniurosaurus* Barbour (Reptilia: Eublepharidae) with a discussion of geographic variation in *Goniurosaurus lichtenfelderi*. *Acta Herpetologica Sinica* 6:43-47.
- Grismer, L. L., H. Ota and S. Tanaka. 1994. Phylogeny, classification, and biogeography of *Goniurosaurus kuroiwae* (Squamata: Eublepharidae) from the Ryuku Archipelago, Japan, with description of a new subspecies. *Zool. Sci.* 11:319-335.
- Grismer, L. L. 1997. Eublepharid geckos, Living relics of gekkotan evolution. *Fauna* 1(1):26-33.
- Henkel, F. H., and W. Schmidt. 1995. *Geckoes*. Malabar, FL: Krieger Publishing.
- Kaverkin, J., S. Mamet and M. Toriba. Husbandry and reproduction of the eublepharid gecko *Goniurosaurus kuroiwae splendens* in captivity. *Akamata* 10:23-26.
- Kluge, A. 1967. Higher taxonomic categories of gekkonid lizards and their evolution. *Bull. American Mus. Nat. Hist.* 135:1-60.
- Ota, H. 1989. A review of the geckos (Lacertilia: Reptilia) of the Ryuku Archipelago and Taiwan. Pp. 222-261. *In*: M. Matsui, T. Hikida and R. C. Goris, editors, *Current Herpetology in East Asia*, Herpetological Society of Japan, Kyoto.
- Pope, C. H. 1935. The reptiles of China. *Nat. Hist. of Central Asia*, Vol. 10. NY: American Museum of Natural History.
- Tanaka, S., and M. Nishihira. 1989. Growth and reproduction of the gekkonid lizard *Eublepharis kuroiwae kuroiwae*. Pp. 349-357. *In*: M. Matsui, T. Hikida and R. C. Goris, editors, *Current Herpetology in East Asia*, Herpetological Society of Japan, Kyoto.
- Zhao, E., and K. Adler. 1993. *Herpetology of China*. Society for the Study of Amphibians and Reptiles.

Bull. Chicago Herp. Soc. 33(7):152, 1998

Effects of El Niño on Frog Activity in My Neighborhood in Spring 1998

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Television meteorologists have noted a mild 1997–1998 winter and early spring in the Midwestern U.S., and attribute it at least partly to the “El Niño” phenomenon (warmer than usual Pacific surface waters). A *Chicago Tribune* article (8 April 1998, section 1, page 5) confirms this. I have kept some records of frog activity on my farm in McDonough County, Illinois (latitude 40°30'N), for over ten years, so it was interesting to note the effects.

Pseudacris triseriata were first heard 25 February 1998. Egg masses of introduced *Rana sylvatica* were found on 26 February 1998, the earliest ever recorded for the area. This frog's reproductive period was peculiarly extended, with many breeding 25–28 February 1998, some later in colder weather, and another group of partly younger animals breeding 24–26 March 1998. A pair was seen in amplexus on 26 March 1998. The first *Bufo americanus* call was also on 26 March 1998. Although this is earlier than usual, I have one record from 11 March 1990 during a warm spell.

Pseudacris crucifer called 27 February 1998, and *Hyla versicolor* on 29 March 1998, both earlier than usual. Adult *Rana catesbeiana* and *Acris crepitans* were seen 30 March 1998. Again, this is early, but I did see *Acris* out on 7 March 1987 and 9 March 1990; and adult bullfrogs (*R. catesbeiana*) and *R. blairi* on 12 March 1990 at 70°F air temperature. Bullfrogs were also seen 8 March 1992. *Rana blairi* called on 22 March 1988, 11 March 1990, 6 March 1992 and 26 March 1998 after I had been gone nine days. *Acris* was first heard 5 May 1990 and 26 April 1998, but usually later. *Rana catesbeiana* calls were heard 13 May 1991, 29 May 1993, and

21 May 1998, but are often first heard in June.

Of course, unusual non-herpetological phenologies also occurred. I saw a mockingbird (*Mimus polyglottos*) on 27 February 1998, and woodcocks (*Scolopax minor*) were already courting on 5 March 1998. Snow trillium (*Trillium nivale*) was in flower on 9 March 1992 and 24 March 1998, and a yellow trout lily (*Erythronium americanum*) flowered on 6 April 1998. Showy orchis (*Orchis spectabilis*) and wild hyacinth (*Camassia scilloides*) bloomed 5 May 1998.

The gist of all this is that there have been other mild winters, or mild spells within winters, and the organisms are simply responding to warmer temperature effects. The years 1990 and 1992 were not El Niño years, according to Dr. D. Wise of the Western Illinois University Climatic Station. The records are also partly a function of when an observer was present. And animals can be found even earlier in the winter when inactive. For instance, I uncovered a *Rana utricularia* under a board by a spring on 21 December 1993, and found a *R. blairi* the same way on 28 January 1992.

Some say that El Niño will tend to make the summer of 1998 especially warm and dry. After the abundant rains of April and May, I doubt that pond drying will be early. It appears that all the frog species will reach metamorphosis with about the usual success. Even the latest breeders (*Acris crepitans*, *Rana catesbeiana*, and possibly *Hyla versicolor* and *H. chrysoscelis*) should not be impacted much, and they oviposit in larger bodies of water as well as small ponds. The size and extent of the choruses indicate that populations such as *Acris* are still rebuilding after the effect of the 1988–1989 drought.

HerPET-POURRI

by Ellin Beltz

Duct tape is metallic, guys

Agents of the U.S. Fish and Wildlife Service charged two men of smuggling more than 8,000 animals and a third man was charged as the Miami buyer of the alleged exotic reptile smuggling scheme. The animals had been ordered from the Amazon by a Miami tropical fish store. Included in the ten illegal shipments named in the charges were 3,836 treefrogs; 1,727 matamata turtles; 1,145 poison dart frogs; 418 Surinam toads; 15 dwarf caiman; eight rainbow boas; four black caiman; two caiman lizards; four fish and one green anaconda. Usually the shipments were packed in such a way that casual examination would show only legal manifested tropical fish. However, in one shipment, the turtles' legs were secured with duct tape. I presume this showed on some type of X-ray scan even though the article doesn't say. Officials intercepted the box, and the 48 other boxes that went with it. All the animals are protected by Peruvian laws and many are protected by international treaty. The animals were taken to be cared for while the case proceeds and may eventually be sent back to Peru. [May 27, 1998: *Sarasota Herald-Tribune*, from Esther Lewis; *Fort Myers News-Press*, from Ardis Allen]

Forty indictments in five countries

Following a three-year undercover operation in the U.S., Australia, Canada, New Zealand and Panama, 40 people were indicted for involvement in illegal animal smuggling. "Pound for pound, there is more profit for smugglers in exotic birds than there is in cocaine," said an assistant customs commissioner. The seized animals were placed in zoos in Texas, where some of the arrests occurred. Thousands of animals and millions of dollars are alleged to have changed hands as part of the scheme. [*Chicago Tribune*, May 30, 1998, from Ray Boldt]

Media busted closer to home

The federal government created a sting operation called "Operation Arachnid" and charged a local exotic pet shop owner with smuggling 27 adult spiders along with a declared shipment of juvenile tarantulas from Germany four years ago. [*Chicago Tribune*, June 4, 1998, from Ray Boldt] This story was "big news" for about one day here and the pet shop owner's name was repeated over and over again on TV and radio. In print, he questioned why it took the federal government four years to prepare the charges and then run a media circus around the him for 27 spiders.

Ribbit in Chinese

Pottery produced in China 6,000 years ago has frog images. Three newly discovered pots show unmistakable "totemic frog images" according to Chinese archaeologists. *China Today* reports "... frogs are among the most prominently featured figures—a decorative element common to all early civilizations... painted in a variety of styles. One type of frog pattern looks like the image of real frogs while another is rendered with vivid expression and in bold outline.... Some of the geometric frog figures on this pottery evolved into varying shapes of the Chinese character "mi," [frog].... Rainfall was



especially important for agriculture in ancient times. Frogs frequently croak prior to the fall of rain. Since early people could not account for this natural phenomenon in any kind of scientific way, they accepted that frogs had induced the rainfall. Also, frogs breed prolifically, and this presumably appealed to primitive people, to whom a high reproductive rate was necessary for survival.... Although frog totems no longer existed in the mainstream culture after the Zhou Dynasty (1100–221 B.C.) the vestiges of frog worship can still be found even today among rural people.... Today, the deep attachment to frogs is still strong among several ethnic minorities.... [Some hold frog festivals]... and [some] paint patterns of frogs on the bodies of the deceased before they are buried." [*Qi Huabian*, March 12, 1998, from P. L. Beltz]

Amphibian environments

- Abstracts of articles on decline and recovery of spotted frogs, boreal toads and the Amargosa toad are included in the *Proceedings of the Desert Fishes Council*, (28:1997) available from <phildesfish@telis.org>. [*Froglog* (26:1998) from John W. Wilkinson <daptf@open.ac.uk>] Save a tree, reduce dioxin; read *Froglog* on the web at <<http://acs-info.open.ac.uk/info/newsletters/FROGLOG.html>>.

- Science reports: "Amphibian experts are hopping to the defense of a Utah frog population that they believe is going to suffer from a controversial wildlife policy introduced by Interior Department Secretary Bruce Babbitt. Since 1992, Interior has encouraged states to craft conservation agreements on threatened species to avoid sanctions under the Endangered Species Act. Early last month Babbitt announced that the spotted frog, which probably numbers in the low thousands... would not be listed as endangered because state and U.S. wildlife officials had agreed on measures to help the frog bounce back. But herpetologists say... [that the] plan doesn't adequately estimate the frog's population trends and historical habitat and lacks a scientific basis for frog relocation plans.... The Society for the Study of Amphibians and Reptiles, the Herpetologists' League, and the American Society of Ichthyologists and Herpetologists are drafting a letter asking Babbitt to reconsider. The herpetologists say the spotted frog is only one of many cases in which conservation plans have been drawn up with inadequate scientific input." [280:22 May 1998, from Eloise Beltz-Decker]

- Karen Furnweger sent in a clipping from the June 6, 1998, *New York Times*, which discusses the declining amphibian issue all the way from the 1989 Canterbury, England, World Congress to the present day. Apparently the problem is now so noted and so widespread that last week the National Science Foundation got together a group of environmental scientists to discuss what might be killing the formerly ubiquitous amphibians. Bruce Babbitt attended the seminar and "initiated an interagency task force to monitor the frog decline," according

to the *Times*. Karen pointed out in her note that such an entity already exists. The Declining Amphibian Populations Task Force grew out of the 1989 meeting. I remember the beginning of the discussion. The few, lonely frog researchers had been trilling gently to each other in an amphitheater that would have seated dozens more and as each rose to discuss frogs, the comment was made that “There used to be more frogs when I started.” Or “There were more frogs when I was a kid.” It got kind of eerie during the Q&A when every member of the audience (myself included) was able to name at least one species from our home area that was no longer as commonly found. Since then, amphibianology has grown (not always for the better) as a group of researchers from other fields with no practical knowledge of the species got involved (I kid you not, see *Froglog* 26:1998). So I’m not really surprised that NSF is going to add to the DAPTF alphabet soup.

- “The spread of sex-change chemicals in the environment could soon be tracked with a test that uses tadpoles and liver cells of frogs. The . . . chemicals . . . [which] mimic female hormones . . . are present in many pesticides and plastics. They are causing increasing concern because they have been implicated in breast cancer and declining [human] sperm counts, and may also interfere with fetal development.” [*The Courier*, Houma, LA, June 8, 1998, from Ernie Liner] The organism being used is the African clawed frog, *Xenopus*.
- Speaking of hormone mimics, last year, U.S. Geological Survey biologists reported inducing frog deformities in a control study comparing two widely used mosquito suppressants. Amphibian deformities were found after spraying wetlands with methoprene. They plan to replicate the study this year. [*South Bend Tribune*, May 4, 1998, from Garrett M. Kazmierski]
- A sample of Florida lakes shows that almost no baby alligators hatched in the last nesting season. “The reptiles’ lack of fertility in certain lakes isn’t linked to pesticides this time. And it might have ramifications for people,” reports the *Orlando Sentinel*. [March 31, 1998, from Bill Burnett]
- Somebody sent me a copy of a fantastic newsletter *Herp-line* which is being produced by the *Froglife* and the Herpetofauna Groups of Britain and Ireland. It provides a forum for articles about local herps in a non-technical but not difficult fashion. They offer an “enquiry service” for the general public. In six months they received about 700 calls, most were for “frog advice” followed by questions about “excess spawn” and “snake identity.” Contact <jim@tritonhouse.demon.co.uk> for more information or write *Froglife*, Triton House, Bramfield, Halesworth, Suffolk IP19 9AE, UK, fax 01986-784579.

Records we could live without

- The world began keeping records of temperature and weather in 1856. The World Meteorological Organization released a report which says that the global average air temperature is 1.35 degrees above normal. They blamed the weather on El Niño, a weather system driven by a large pool of abnormally warm water in the eastern Pacific Ocean. Indonesia, parts of the Americas, Mexico and Southern Africa are in drought

conditions, while extra wet conditions continue over Ecuador, Peru and southern Brazil. Heavy rains fell over the Indian Ocean and east Africa where flooding has lessened for the first time since October. [*Orlando Sentinel*, April 16, 1998, from Bill Burnett]

- Indirect temperature sampling provides proxy evidence of temperature and climate far before the 150 years of direct thermometer sampling available to researchers. Using tree rings, ice cores, sediment samples and other proxy methods, temperature variations in the Northern Hemisphere since the middle ages have been compiled, then recent actual records have been added. The resulting graph shows a nice up and down motion of about six degrees from 1400 to about 1920. After 1920, the line still goes up and down a lot, but the trend of the line is up until the 1950s, then a slight drop in the 60s (but still not back to the average) followed by another sharp spike to the late 1990s. Researchers then analyzed the contributing factors of climate change, solar radiation, volcanic activity, carbon dioxide and methane emissions and so forth. Like most “Global Warming” work, this one will generate hot debate. [*New York Times*, April 28, 1998] Curiously, the sidebar points out that El Niño weather systems are caused by warming of the Southern Pacific Ocean by the action of under-seas volcanos which release mantle heat and create new sea floor. Just remember that the plants and animals will try to move to their optimum zones depending on the new climate. Are we ready for alligators, caiman and turtles in the Chicago River?

They may not survive the fires in Mexico

Many U.S. officials fear that a major environmental disaster awaits in southern Mexico. Parts of the Chimalapas biological reserve, one of the most important tropical rain forests in the Americas were burning for weeks. Most of North America’s migratory birds stop in the area, and thousands of plants species in the reserve are otherwise completely endangered. The fires started from lightning or agricultural arson and spread because of El Niño influenced drought according to U.S. climatologists. [*Chicago Tribune*, June 6, 1998, from Ray Boldt and P. L. Beltz]

While Florida also burns

Flatwoods salamanders in the pine woods of northern Florida are being considered for the Federal Endangered Species Act. Logging remains the biggest threat to the salamanders. Pine tree farming is highly mechanized and bulldozers are used to clear the fields for replanting which totally destroys the tiny microhabitats favored by the salamanders. Federal officials are working with the forestry industry to study the salamanders and find ways to log and save the species. [*Gainesville Sun*, April 13, 1998, from Ken Dodd, Jr.]

In his own words

Signing himself “Proud to be a San Diego City Firefighter,” the man who responded to the call of a snake biting a pregnant woman wrote his side of the story to Ann Landers. As printed in the May 4, 1998, *Chicago Tribune* he wrote: “. . . I am the San Diego city firefighter who responded to that snake attack.

Four adults, two children and one 10-foot Burmese python were residing in the downtown San Diego hotel room where the attack took place. When the fire engine crew, paramedics and police entered the room, it was an immediate rescue situation. The snake had a full open bite on the pregnant woman's inner thigh and was constricting around her stomach. The woman's husband was straddled above her, trying desperately to yank the snake off. When I grabbed the snake behind its head, the husband passed out and hit the floor. The snake was constricting so hard that I could pick up the woman by pulling on the snake. I had no option but to cut off the head using a knife that I always carry with me. I have since received many complaints and threats from animal rights groups and activists for killing the snake. To them, I do not apologize. This was a vicious attack, and the woman was eight months pregnant. I wonder what these people would say if the attack happened two months later and the snake went after a defenseless infant. . . . " [from Ray Boldt]

But the times they are a-changing . . .

- The police chief of a town in Louisiana was driving along one of those highways that parallels a canal. He saw a 10-foot gator in his lane, swerved to miss it and landed his police cruiser in the canal. The officer "has since had alligator nightmares," and promises to find the giant reptile for questioning. [*Times Picayune*, New Orleans, LA, from Ernie Liner] Most of the media has made this a "stupid human tricks" story. Please note however, that the times have changed. The southern law enforcement officer deliberately did not run the gator over, did not shoot the gator, did not harass the gator; instead he tried to drive *around* the gator and in the process got himself a bruised knee and a sore back.
- Animal Control workers in Tangipahoa Parish, Louisiana, captured a 12-foot, 95-pound Burmese python they found sunning itself on a sofa in the window of a vacant mobile home. The officer said the home was apparently abandoned with all its contents, including the snake. [*The Courier*, Houma, LA, from Ernie Liner]
- A 4½-foot alligator strolled out of the Bayou Lafourche and visited the local Walgreens drugstore drive-through. The cashier said, "It was cool." The manager said, "We stay open 24 hours, and even serve alligators." Officers from the Thibodaux Police Department came and kept an eye on the alligator until she slipped back into the ditch. [*The Courier*, May 26, 1998, from Ernie Liner]

News and notes

- Chicago Wilderness has established a delivery system for copies of their *Atlas of Biodiversity*. It includes some pictures of herps and an interesting perspective on the state of our wildlife and natural areas. For free individual copies, visit Volo Bog, Indiana Dunes National Lakeshore, Fullersburg and Willowbrook Nature Centers in DuPage and the Nature Conservancy office in downtown Chicago. For directions to the last or to order copies (\$2.50 includes shipping to one address) for schools or scouts, call Cindy Vasquez at (312) 346-8166, x22. [from Stacy Miller]

- The second International Symposium and Workshop on the Management of the Eastern Massasauga Rattlesnake will be held October 1-3, 1998, at the Toronto Zoo. Contact Bob Johnson <bjohnson@metrotor.on.ca> or by fax, (416) 392-4979.

Thanks to everybody who contributed this month and to Ernie Liner, P. L. Beltz, Bill Burnett, Ray Boldt, Kathy Bricker, Esther Lewis, Jon Covell, and Philip Drajese for stuff I enjoyed reading, but didn't use this month. Become a contributor, too! Send whole pages of newsletter (or clippings if you prefer) with the date/publication slug and your name on each piece to: Ellin Beltz, 1647 N. Clybourn Avenue, Chicago, IL 60614-5507.



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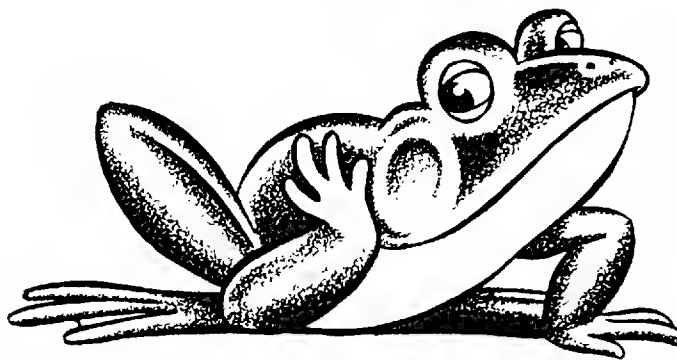
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The Tympanum

Ellin Beltz, in her *HerPET-POURRI* column in the May 1998 CHS Bulletin [33(5):103], commented on an item that appeared in the *Chesterton, Indiana, Tribune*, in which Katie Smith of the Indiana Department of Natural Resources was quoted as saying, "There are always a small percentage of deformed amphibians in a population. I'm hesitant as a scientist to make anything of this." The following exchange of E-mail messages subsequently took place between Ellin and Dr. Sherman Minton, Jr., of Indianapolis.



a deformed amphibian. We have vanished amphibians (cricket frogs) and nearly vanished and rebounded amphibians (leopard frogs) — but no deformed frogs.

There is, of course, no way to go back in time and sample this background data, but I still question if deformities

occurred on any great scale in the past and personally feel that any state agency uninterested in truly studying an issue which may be of greatest importance to human health is short-sighted. . . . Ellin <ebeltz@ripco.com>

Hello Ellin — Concerning the item on deformed amphibians in Indiana (p. 103), Katie Smith speaks for all the Indiana herp community so far as I know. We have no data to permit us to say anything else. Of course there is a background level of deformities in Indiana amphibian populations. We just don't know what it is. To take just one cause, Stan Sessions had a paper last summer in Seattle and a note in the April number of *Froglog* concerning the role of trematode larvae in producing abnormal limb development. This certainly has been going on for thousands of years and produces a certain level of "background." Naturally this may change, and human factors may have affected it in recent decades, but we don't know. Of course some levels of deformities that have been reported in Canada and the northern Midwest must be way above background and are probably xenobiotic, but we have no reports like these from Indiana. I don't do much collecting any more, but in the last three years or so I recall only one deformed amphibian, and it was brought to me by a member of the local herp society. This was an adult *Ambystoma maculatum* with a fifth leg growing in the area about midway between the normal limbs. Although there is no organized project by DNR or anyone else, there are local herpetologists aware of the problem. In conclusion, Katie Smith is not talking outside her field of expertise. Best regards — Sherman Minton <nactus@aol.com>

Dear Sherman: Nice to hear from you on this. I am interested in this issue of "background" because until the first deformed amphib stuff came out, there was not much except two-headed turtles and snakes for herp-deformity stuff. There's a grad student working through my files (and Wes von Papineau's files) counting types of herp articles and there are NO deformed frogs before the current firestorm started.

I am not aware of any deformed frogs in collections, nor reports of deformed frogs from early herpetologists. In fact, Girard's last paper was on "bicephaly in turtles," and I have a reference to it in his biography.

But deformed frogs and salamanders — no references. This is why I question a statement of "background deformity," particularly since in context of the article it looked like the DNR was just blowing off any responsibility for studying amphibians and using it as an excuse.

In all the years that [my husband] Ken and I have worked in the field (thousands of individual captures) we have yet to find

Hi Ellin: Thanks for your letter. Perhaps deformities such as extra limbs in frogs weren't reported in the past because they didn't seem all that important. However, I do think some could be found if anyone did a careful search of *Copeia* and some of the other journals. I seem to recall such a report in *Turtlox Newsletter* long ago, and I seem to recall once catching a frog with an extra limb. I put it in the same class as lizards with forked tails. You might check Reaser and Johnson, "Amphibian Abnormalities," a review in *Froglog* 24:2, 1997. There also was a workshop on amphibian deformities sponsored by National Institute of Environmental Health Sciences in December 1997. Ken Dodd gives information in *Froglog* for April 1998. I think there really is a background level, but I also believe levels of deformity far above background have occurred locally. Cheers — Sherman

Dear Sherman: The other subset of deformities in my files (to 1987) is deformed salamanders due to acid rain, usually in the northeastern United States. We have a lot of two-headed turtles and two-headed snakes and white alligators — but not frogs. Ken says the only deformed frog he's ever handled was in the last two years. I'm reminded of that important meeting at 1st World Congress when *everybody* was saying that frogs were declining, but no one had numbers to prove it. That spawned DAPTF; and the huge upswing in funding/interest in amphibians. Maybe what we're seeing (in some few cases) is an increase in apparent background rate due to more searchers and more "hands-on" frog studies.

I certainly used to go to ponds in spring, listen, run a Karns scale of intensity on the calls, spotlight a few and leave. I'm not sure that I would have noticed deformities since my observational style was not to harass the animals. However, Ken and I seine a lot and have not yet found deformed frogs in the seine. Probably the only thing we haven't yet caught as we've done the typical boots, car parts and dead shells.

My concern with the Indiana situation was that there was a report of four discrete localities with deformities and an effectively state spokesperson seeming to brush it off with a comment about "background effect." The situation certainly merits a look-see; one wonders what is more important to a state heritage biologist than a situation causing deformities in vertebrates. . . . Ellin

Herpetology 1998

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

MANAGEMENT UNITS FOR THE DESERT TORTOISE

H. B. Britten et al. [1997, Copeia (3):523-530] assayed blood samples from 236 desert tortoises, *Gopherus agassizii*, representing 15 sites in northeastern Mojave Desert (Nevada, Utah), for variation in allozymes and mitochondrial DNA restriction sites. Morphometric measurements from 257 tortoises from the same locations were subjected to sheared principal component analysis. The 15 localities were partitioned into five management units. The authors assess geographic concordance between the five management units delineated in this study and proposed Desert Wildlife Management Areas (DWMAs), delineated ecologically. They also discuss suggestions for improving placement and boundaries of DWMAs.

FROGS OF THE NEUSIEDLERSEE REGION

H. G. Tunner and L. Kárpáti [1997, Herpetozoa 10(3/4): 139-148] report that the Neusiedlersee region, on the border of Austria and Hungary, is the habitat of a unique water frog fauna composed of *Rana lessonae* and *R. esculenta*. *Rana esculenta* is a hybrid that originally arose from crosses between *R. ridibunda* and *R. lessonae*. Around Neusiedlersee, *R. lessonae* males and females are about equally common while the females of the hybrid account for 97% of the *R. esculenta* specimens. Successful mating occurs between *R. lessonae* males with conspecific females and between female *R. esculenta* and male *R. lessonae*. An aberrant type of clonal reproduction (hybridogenesis) guarantees that mating between *R. lessonae* males and *R. esculenta* females results exclusively in *R. esculenta* progeny. The present distribution of water frogs in the lake region (*R. esculenta* predominating in the northern part) is apparently a consequence of the geological formation of the region and its ecology. An extended yearly migration of *R. lessonae* to more northern breeding areas results in the persistence of female *R. esculenta*.

DEWLAP SIZE IN CARIBBEAN ANOLES

J. B. Losos and L.-R. Chu [1998, Copeia (2):430-438] note that the dewlaps of anoles vary greatly in size. Some species have no dewlap at all. The dewlap serves many purposes—e.g., courtship, territorial interactions, species recognition, and predator deterrence—and must be an effective communicatory signal in different light environments. The authors measured dewlap size in 52 species of Caribbean anoles to test a variety of hypotheses concerning the evolution of dewlap size. Species with conspicuous body colors or patterns tend to have relatively smaller dewlaps. Also, the data suggest that species in poorly lit habitats may have relatively larger dewlaps than species in brighter habitats. By contrast, no relationship exists between relative dewlap size and structural habitat, display rate, or sexual size dimorphism. Further, comparisons of the dewlaps of sympatric species do not support the hypothesis that differences in dewlap size aid in species recognition.

CHELONIAN CARAPACE REGENERATION

G. Kuchling [1997, Chelonian Cons. and Biol. 2(4):500-506] notes that adult individuals of many chelonian populations may experience damage to their carapace which can regenerate. In terrestrial chelonians, extensive damage and regeneration of the carapace occur relatively frequently as a result of fire. In contrast to box turtles (genus *Terrapene*) of the family Emydidae, several tortoise species of the family Testudinidae (suborder Cryptodira) and *Pelusios subniger* (Pelomedusidae, suborder Pleurodira) are shown to have the capability of restoring normal scute patterns during carapace regeneration if the underlying bone plates have not been totally destroyed. If bone plates have been totally destroyed, the typical scute pattern cannot be restored. The forces that determine the restoration of the epidermal scute patterns derive from the dermal bone plates, the regeneration of which is in turn influenced by the axial skeleton. This regenerative capability seems to be a primitive feature of chelonians. Differences between chelonian groups in the capability of restoring the scute pattern during regeneration may be related to their relative degree of evolutionary specialization.

A NEW FROG SPECIES FROM SOUTHERN INDIA

M. S. Ravichandran [1997, Hamadryad 22(1):9-12] describes a new species of ranid frog, *Nyctibatrachus vasanthi*, from the Kalakad Tiger Reserve, Tamil Nadu, southern India. The new species is diagnosed by the following characters: canthus rostralis and tympanum indistinct; interorbital space wider than the upper eyelid; tongue short, lacking a papilla; vomerine teeth present; skin smooth; fingers free; toes webbed to the base of disks; and digital disks present. The new species is compared with known congeneric species, including species formerly assigned to the genus *Nannobatrachus*.

NEW PONDS FOR AMPHIBIANS

A. H. P. Stumpel and H. van der Voet [1998, Amphibia-Reptilia 19(2):125-142] sampled newly constructed ponds in the Netherlands for the presence of amphibians. Nine species were found. Relationships were established with pond characteristics and effects were found of factors such as pond age, topography of the surroundings, vegetation cover of water and bank, and electrical conductivity of the water. A total of 16 pond characteristics were screened for their explanatory power to discern ponds that are or are not inhabited by a certain amphibian species. Also interactions between pond characteristics were screened, and were often found to be significant. For example, electrical conductivity was strongly related (negatively) with *Rana temporaria* presence in the older but not in the younger ponds. The greatest number of effects were found for *Triturus vulgaris* and the least for *T. cristatus*. The effects give indications as to the specific requirements to be considered when constructing ponds.

SEXUAL DIMORPHISM IN THE EASE OF TAIL LOSS

S. F. Fox et al. [1998, *Copeia* (2):376-382] observe that tail autotomy is used by many lizard species to escape predation, but in those species that have the adaptation, the degree to which it is developed depends on relative costs and benefits. The same may be true for the development of tail autotomy in the two sexes of the same species. The authors examined the ease of tail autotomy of male and female *Uta stansburiana*. Correcting for tail thickness, males lose their tail significantly less easily than females and retain it even more strongly as they grow larger from sexual maturity on. Although both sexes lose social status after tail loss, females may have available an alternative, subordinate, social role in which they can retain some reproductive success. Males do not have such an alternative strategy, and since they need both a complete tail and high social status for reproductive success, they require more stimulus to autotomize their tail (i.e., the cost of tail autotomy is higher in males than in females). For both males and females, lizards with incomplete tails from a previous autotomy have reduced antipredator defense via tail autotomy. We predicted that second-time autotomy would occur more readily, as compensation. But females did not show this compensation and autotomized the tail with equal ease the first and second times. Males autotomized more easily the second time, but we do not interpret this change as compensation for a shorter tail. For males, the cost of tail loss is much reduced after a prior tail autotomy; they have already lost their social status following autotomy, and further tail loss is less consequential. At the second autotomy, males reduced their ease of tail autotomy to equal that of females, and females did not show facilitated second-time autotomy. Therefore, males, like females, did not show easier tail autotomy as compensation for an incomplete tail.

PREY-HANDLING BY WHIPTAIL LIZARDS

D. J. O'Connell and D. R. Formanowicz, Jr. [1998, *J. Herpetology* 32(1):75-79] compared foraging behavior of juvenile and adult Texas spotted whiptail lizards, *Cnemidophorus gularis*, when preying on a nondangerous species, the lab cricket *Acheta domestica*, and a potentially dangerous species, the scorpion *Centruroides vittatus*. When presented with scorpions as prey, both naive juveniles and presumably experienced adult *C. gularis* executed prolonged and violent attack sequences. In contrast, when presented with crickets of similar size, lizards exhibited an abbreviated, less violent foraging sequence. Certain actions like head shaking with prey clutched in the jaws and throwing of prey, which were always present in the foraging repertoires of adult and juvenile lizards when foraging on scorpions, were almost never present when foraging on crickets. In addition to the effect of prey type, scorpion size also affected the attack sequence executed by adult lizards. More total attacks and more violent attacks were directed toward large scorpions than toward small scorpions. These experiments indicate that *C. gularis* may distinguish between different levels of risk associated with foraging on different types and sizes of prey, and that further, this ability to distinguish is present in naive individuals and is likely an innate response.

PREDATOR-PREY ROLE REVERSALS

J. W. Petranka et al. [1998, *Herpetologica* 54(1):1-13] note that wood frog (*Rana sylvatica*) tadpoles are microphagous filter-feeders that function as primary consumers in vernal pond communities. Nonetheless, field observations suggest that tadpoles may shift temporarily to higher trophic levels and prey upon the eggs of an upper-level predator, the spotted salamander (*Ambystoma maculatum*). The authors conducted experiments in both artificial mesocosms and in natural ponds to determine factors that influence tadpole predation rates on white and clear egg masses of *A. maculatum*. In an artificial pool experiment, tadpoles significantly reduced embryonic survival of *A. maculatum*. When supplemental food level was low, rates of egg predation were relatively high and clear egg masses suffered greater mortality than white egg masses. In a field experiment, they used cages to protect egg masses from predators in ponds with and without tadpoles of *R. sylvatica*. Survival of embryonic *A. maculatum* was lower for uncaged egg masses in both sets of ponds, but extremely low for egg masses in ponds with tadpoles of *R. sylvatica*. As in the artificial pool experiment, white egg masses were less vulnerable to tadpole predation than clear egg masses. Results from a correlation analysis of data collected from 84 breeding sites at a bog complex in western North Carolina indicate that the percentage of white egg masses increases with the density of egg masses of *R. sylvatica* from local breeding sites. Collectively, the data suggest that opportunistic predation by a primary consumer can result in high premetamorphic mortality of an upper-level predator. The authors hypothesize that tadpole predation is one of several selection pressures maintaining egg color polymorphism in *A. maculatum*.

BODY AND HEAD SIZE PLASTICITY IN RESPONSE TO AMOUNT AND SIZE OF PREY

A. Queral-Regil and R. B. King [1998, *Copeia* (2):423-429], to test whether variation in body size and relative head dimensions may be a phenotypically plastic response to feeding experience in snakes, assigned neonate water snakes, *Nerodia sipedon*, from four litters ($n = 48$) to two feeding treatment groups. One group was offered one large minnow twice weekly; the other group was offered two small minnows twice weekly. Body size (snout-vent length, mass) and head dimensions (head length, head width, jaw length, interocular distance) were measured at the beginning of the experiment and upon completion of the experiment 20 weeks later. Repeated-measures multivariate analysis of variance revealed significant effects of feeding treatment, sex, and family on change in body size. Repeated-measures MANCOVA (with body length as covariate) also revealed a significant effect due to family on change in head dimensions. The multivariate effect of feeding treatment on head dimensions approached statistical significance ($P = 0.102$); the univariate effect of feeding treatment was significant for jaw length ($P = 0.010$). Females increased in body size more than males did, and snakes offered large fish increased in body size and jaw length more than snakes offered small fish. These results suggest that body size and jaw length respond plastically to amount and size of prey.

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Artist wanted: My name is Jim Hatfield. I wrote the book, *Green Iguana—The Ultimate Owner's Manual* and I have an iguana column for *Vivarium* magazine. I am looking for some talented CHS member who could draw cartoons and/or iguana illustrations for my column and articles in other reptile magazines. Send me copies (*only*) of your work to: Jim Hatfield, P.O. Box 102, Lake Oswego OR 97034-0014. I will then get in contact with you.

Breeders' Expo: Atlanta Georgia's 3rd annual Breeders' Expo is September 5, 1998. **Only non-venomous, captive-bred animals.** Contact Georgia Herpetological Society, P.O. Box 464778, Lawrenceville GA 30046, or David Bowman at (770) 505-0547, for more information.

For sale: rats and mice—pinkies, fuzzies and adults. Quantity discounts. Please send a SASE for pricelist or call Bill Brant, *THE GOURMET RODENT*, 6115 SW 137th Avenue, Archer FL 32618, (352) 495-9024, E-mail <GrmtRodent@aol.com>.

For sale: murine-pathogen-free rats and mice available in all sizes, live or frozen: pinkies, fuzzies, crawlers, small, medium and large. Frozen crawler mice in lots of 2000, \$.17 each. Also available, full grown hairless mice. FOB shipping point. Master Card accepted. Call (518) 537-2000 between 8:00 A.M. and 5:00 P.M. or write SAS Corporation, 273 Hover Avenue, Germantown NY 12526 for prices and additional information.

For sale: from **The Mouse Factory**, producing superior quality, frozen feeder mice since 1989. Our mice are frozen separately and vacuum-packed to greatly extend freezer life by reducing freezer burning and preserving vitamin and nutrient content. We feed our colony a nutritionally balanced diet of Mouse Chow and four types of natural whole grains and seeds. Prices: pinkies, \$25/100; fuzzies, \$30/100; weaned, \$35/100. Quantity discounts available. Ray Queen, P.O. Box 85, Alpine TX 79831. Call (800) 720-0076 or E-mail us at <mousefac@overland.net>. Fax (915) 837-0156.

For sale: from Bayou Rodents, excellent quality feeder mice and rats. Every size available. Pinks starting at \$20/100. Orders are shipped by overnight service Monday thru Thursday. We accept Visa, MasterCard and Discover. For more info, contact Rhonda or Peggy, (800) 722-6102.

For sale: **high quality frozen feeders.** Over a decade of production and supply. Seven sizes of mice available: small newborn pinks up to jumbo adults. Prices start at \$25 per 100. Feeders are separate in the resealable bag, not frozen together. Low shipping rates. Free price list. Kelly Haller, 4236 SE 25th Street, Topeka KS 66605, (913) 234-3358 evenings and weekends.

For sale: In stock, Flex-watt and Ultra-therm heating products. **Frozen rodents** always available. Mice: pinks—crawlers, 3/\$1; weanlings, 40¢; subadult, 50¢; adults, 65¢; large adults, 75¢. Rats: small, 85¢—\$1; medium, \$1.25–2.00; large, \$2.25–2.75; jumbo, 3/\$10. Call on quantity discounts [note: discount on orders picked up at CHS meetings]. Live rodents available at higher prices. **Available now:** newsletter/catalog—many unique/hard-to-find herp husbandry items. Send business-size SASE for catalog, or call. Scott J. Michaels, D.V.M, Serpent City, P.O. Box 657, Island Lake IL 60042, (815) 363-0290.

For sale: Selling most of my collection. Great prices—some freebies! Some herps, but mostly arachnids. Andy Davies, (773) 279-1541.

For sale: one male and four female redfoot tortoises, \$150–200 each. Marc, (815) 293-0989 eves.

For sale: bearded dragon hatchlings from exceptional parents, \$30 each (quantity discounts). Coming in August, amelanistic corn snakes, \$15 each; high-yellow leopard geckos, \$15 each. For pickup only. John Cebula (Glen Ellyn IL), (630) 858-3767.

For sale: The Snake Lady has albino corns, hypo corns, ball pythons (eating well), Burmese pythons (albino and normal), boa constrictors and green tree pythons (2-year-olds and hatchlings) very tame and eating well. One male Argentine boa. Albino alligator (great investment opportunity), serious inquiries only, \$50,000 firm. Call Tonya Maris for more info and current price list, (630) 851-2331 phone, (630) 851-9672 fax.

For sale: one male and one female black pine snakes (*Pituophis melanoleucus lodingi*), c.b. '96, unrelated, \$170/pair; one male and one female Mexican gopher snakes (*Pituophis deppei jani*), c.b. '97, \$220/pair; one female Cape gopher snake (*Pituophis vertebralis*), c.b. '97, \$80. All five animals for \$400. Bart Bruno, (203) 773-9257. [CT]

For sale: c.b. '98 snakes. Blotched kings (“*goini*”), \$35 each; Cal. kings—banana and nice aberrants, \$30–75 each—lavender, \$35 each—lavender hets, \$10 each; Sinaloan milks (possible aberrants), \$30–75 each; cube corns, \$100 each; *childreni*, \$100 each. I have pictures of aberrant Sinaloans. Joe, (708) 450-1614.

For sale: c.h. '97 blonde trans-Pecos rat snakes, one male and one female, \$160 each, one female, bright, \$180; female Mexican milk, \$45; male Jalisco milk, \$60; tangerine Honduran milks, one male, \$75, two females, \$80 each; albino male San Diego gopher, \$90; Florida kings, normal female, \$25, Goin's female, \$40, Goin's adult male, \$100; one subadult c.h. male Baja rat, \$400. *Vivarium*, Vol. 1, No. 1 and No. 2, \$250 for both. Ron Cashuk, (520) 774-3826. [AZ]

For sale: captive bred '98 Reptiles. Albino northern pine snakes, Snow stock, from exceptional parents, \$45 each; orange Pueblan milksnakes, Seven Generations stock, beautiful, \$45 each; prairie kingsnakes, normal and albino, \$15–25 each; corn snakes, Okeetee phase, Snow stock, exceptional!, \$10–20 each; Kenyan sand boas, nice orange, \$35 each; hi-yellow leopard geckos, beautiful babies, Brookfield Zoo stock, \$10. All proceeds will be donated to the Wildlife Education Outreach Program operated by the Lake Forest Recreation Department. Rob Carmichael, (847) 615-4388, or E-mail: <CarmichR@CityLF.LFC.edu>.

For sale: 1998 prospective hatchlings—Baird's rat snakes, prairie kingsnakes, California kingsnakes, \$25 each; red milksnakes, \$35 each; Mexican black kingsnakes, \$40 each; trans-Pecos rat snakes, \$45 each; albino speckled kingsnakes, Sinaloan, Pueblan, Mexican milksnakes, San Luis Potosí kingsnakes, \$50 each; Ruthven's kingsnakes, \$75 each; *thayeri*, *greeri*, graybands, \$100 each; Arizona mountain kingsnakes, \$125 each. Some breeders available. Steve Mitchener, (405) 748-6566 (after 5 P.M. CT). [OK]

For sale: c.b. '98 hatchlings from the following projects. */Drymarchon/* Texas indigos (*D. corais erebennus*), \$300 each; blacktail cribs (*D. c. melanurus*), \$150 each; Mexican indigos (*D. c. rubidus*), \$350 each; */Pituophis/* Louisiana pines (*P. ruthveni*), \$275 each; albino bulls (*Pituophis melanoleucus sayi*), \$150 each; anerythristic San Diego gophers, \$125 each; */getula/* Outer Banks kingsnakes (*Lampropeltis getula sticticeps*), \$200 each; Cal. kings (rare Davis locale), \$40 each. Also, trans-Pecos blonde, hognose and Honduran projects. Call Brad for details (all hatchlings will be properly sexed and feeding). Brad Scialabba (Chicagoland), (708) 749-3864 after 6 P.M. or leave message.

For sale: **Premium captive-produced reptiles.** Piebald black pines; Brazilian rainbow boas (Lamar); blonde trans-Pecos rat snakes; Baja rat snakes; gray-banded kingsnakes (Langtry); Okeetee corns; melanistic garters (double hets); Peruvian matamatas; Mexican redleg tarantulas. Also, feeder mice and rats, husbandry items, bedding, etc. Mike Stefani, (630) 372-3936.

For sale: beautiful, tricolor kingsnakes. Send SASE for **free** list. Also, free phone consultation on snake husbandry problems as a service to the herp community. Robert Applegate, P.O. Box 338, Campo CA 91906, (619) 478-5123. Thank you for your attention.

Advertisements (cont'd)

For sale: female Argentine boa, 2 years old, \$100; female Colombian boa, 3 years old, \$100; pair of Bay of L.A. rosy boas, 2-year-olds, \$100/pair; one male and two female Baja rosy boas, 2-year-olds, \$150/trio; male Indonesian carpet python, 3 years old, \$100. Assorted glass aquariums with screen tops, 10s, 30s, 40s and 55s. Make me an offer. Will negotiate on all for sale. Ron Silver, (773) 973-4780 days, (773) 539-6339 evenings.

For sale: Diamond pythons, \$1500 each; womas, \$5000/pair; jungle carpets, \$225 each. All from top bloodlines, unrelated bloodlines available. Also available: genuine 75% diamond/jungle crosses, we are female heavy on these and will sell single or multiple females, \$200 each; juvenile **red acanthurus monitors**, \$1200 each; Kimberly rock monitors (*Varanus glauerti*) hatching soon, \$2500 each; *V. flavirufus* incubating. All animals captive bred at our facility. **Python Pete**, (619) 273-1925, fax (619) 273-3126. Lots of pictures and breeding info at our web site: <www.pythonpete.com>.

For sale: diamond and jungle carpets, \$175 each; Macklot's pythons, \$100 each; Children's pythons, \$100 each; creamsicle corns, \$40 each; albino corns, \$22 each; snow corns, \$20 each; bubblegum corns, \$25 each; candy-cane corns, \$35 each; het creamsicle corns, \$15 each; Vegas Cal. kings, \$20 each. **Adults:** creamsicle, \$60; het ghost, \$60; Children's python, \$150; ball pythons, \$175/pair; Dumeril's, \$600/pair; Argentine rainbows, \$500/pair; Haitian boas, \$150/pair; Brazilian rainbows, \$250 each; Indonesian bluetongue skinks, \$55 each. Flexwatt heat tape, \$2.50/ft, \$5 each connection. Steve Bostwick (515) 274-4580, E-mail <lasis@juno.com>. [IA]

For sale: Brazilian rainbow boas — 2-year-old, 3' female, tame, healthy and a great eater, \$250 — 7-month-old female, \$175; lavender phase Cal. king, \$50. Mark, Strictly Serpents, (847) 854-3259.

Tours: Adventure tours to Madagascar! Join **Bill Love** seeing and photographing fauna and flora, heavily herp-biased, across the world's least known mini-continent. Maximum fun & photo ops assured on every trip. Contact him at: BLUE CHAMELEON VENTURES, P.O. Box 643, Alva FL 33920. TEL: (941) 728-2390, FAX: (941) 728-3276, E-MAIL: <blove@cyberstreet.com>.

Tours: **Road-riding in Costa Rica!** Treat yourself to the trip of a lifetime! Learn about tropical herps, find them, photograph them, see where they live. **Greentracks, Inc.**, offers the best herpetological tours led by internationally acclaimed herpetologists and herpetoculturists. See the Amazon, visit cloud forests, experience the world's greatest rainforest, super sunsets and good company. Call (800) 9-MONKEY.

Wanted: Florida pine snakes (*Pituophis melanoleucus mugitus*), locality data important. Bart Bruno, (203) 773-9257. [CT]

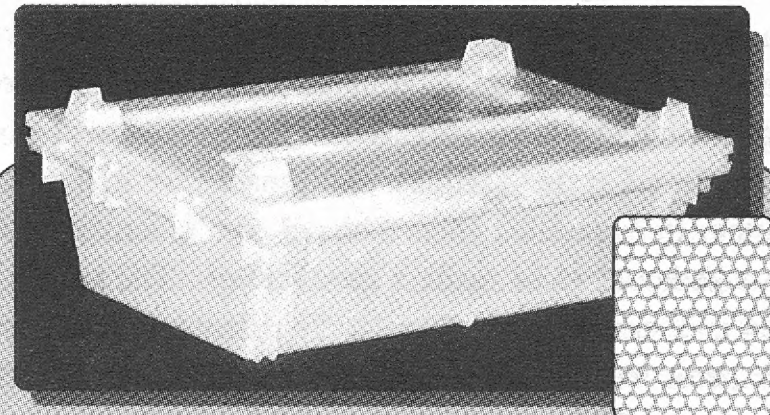
Wanted: Healthy adult female Queensland coastal carpet python for breeder. Call Matt Walter, (217) 446-0941 ext. 116 daytime or (217) 431-2745 evenings and leave a message.

Line ads in this publication are run free for CHS members — \$2 per line for nonmembers. Any ad may be refused at the discretion of the Editor. Submit ads to: Michael Dloogatch, 6048 N. Lawndale Avenue, Chicago IL 60659, (773) 588-0728 evening telephone, (312) 782-2868 fax, E-mail <MADadder0@aol.com>.

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UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, July 29, at the Field Museum of Natural History, Roosevelt Road at Lake Shore Drive, in Chicago. The program at this meeting will be an "Experts' Corner," at which knowledgeable CHS members, including veterinarians, will be available to share advice and answer questions about your favorite reptiles and amphibians. Questions will be taken from the audience during the program, but you are also encouraged to prepare your questions ahead of time and submit them in writing prior to the start of the program.

The speaker at the August 26 meeting will be Lee Weigt, a researcher at the Field Museum who has been studying DNA sequencing in Neotropical frogs. This study was funded in part by a CHS grant.

We are required to use the entrance on the west side of the museum. **We are allowed to use the free parking lot to the west of the museum as long as space is available. Your best bet is to try that lot first before settling for the lot to the east of the museum or for the Soldier Field lot. For the latest on the parking situation call our CHS message line, (773) 281-1800, before you come.** Public transportation is an option: the Roosevelt Road (12th Street) bus now goes directly to the museum, thus providing a connection with the el and subway. This bus service runs until 11 P.M.

Turtle Club

The Chicago Turtle Club will meet Sunday, July 26, 1:00–3:30 P.M., at the North Park Village Administration Building, Room 105, 5801 N. Pulaski, in Chicago.

1998 CHS PICNIC

After a three-year hiatus, this summer we are once again holding a CHS Picnic. The date is Sunday, August 2, and the location is the Catherine Chevalier Woods out near O'Hare Airport at East River Road/Dee Road and Bryn Mawr Avenue (exit the Kennedy Expressway at Cumberland, go south to Bryn Mawr, then west to East River Road). The action will start at Noon and last until everyone goes home. The CHS will provide grills and sodas/soft drinks; you bring your own food. We'll have the usual assortment of games and activities planned for kids and adults. For more details, call Audrey Vanderlinden, (773) 836-2477.

MOVING??

Please let us know in plenty of time of any change in your mailing address. The *Bulletin of the Chicago Herpetological Society* is sent to our U.S. members by bulk-rate third class mail. This means that the U.S. Post Office will not forward your *Bulletin* with the rest of your mail. This is so even if you make a special request that your magazines be forwarded (such a request only applies to second class mail).

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